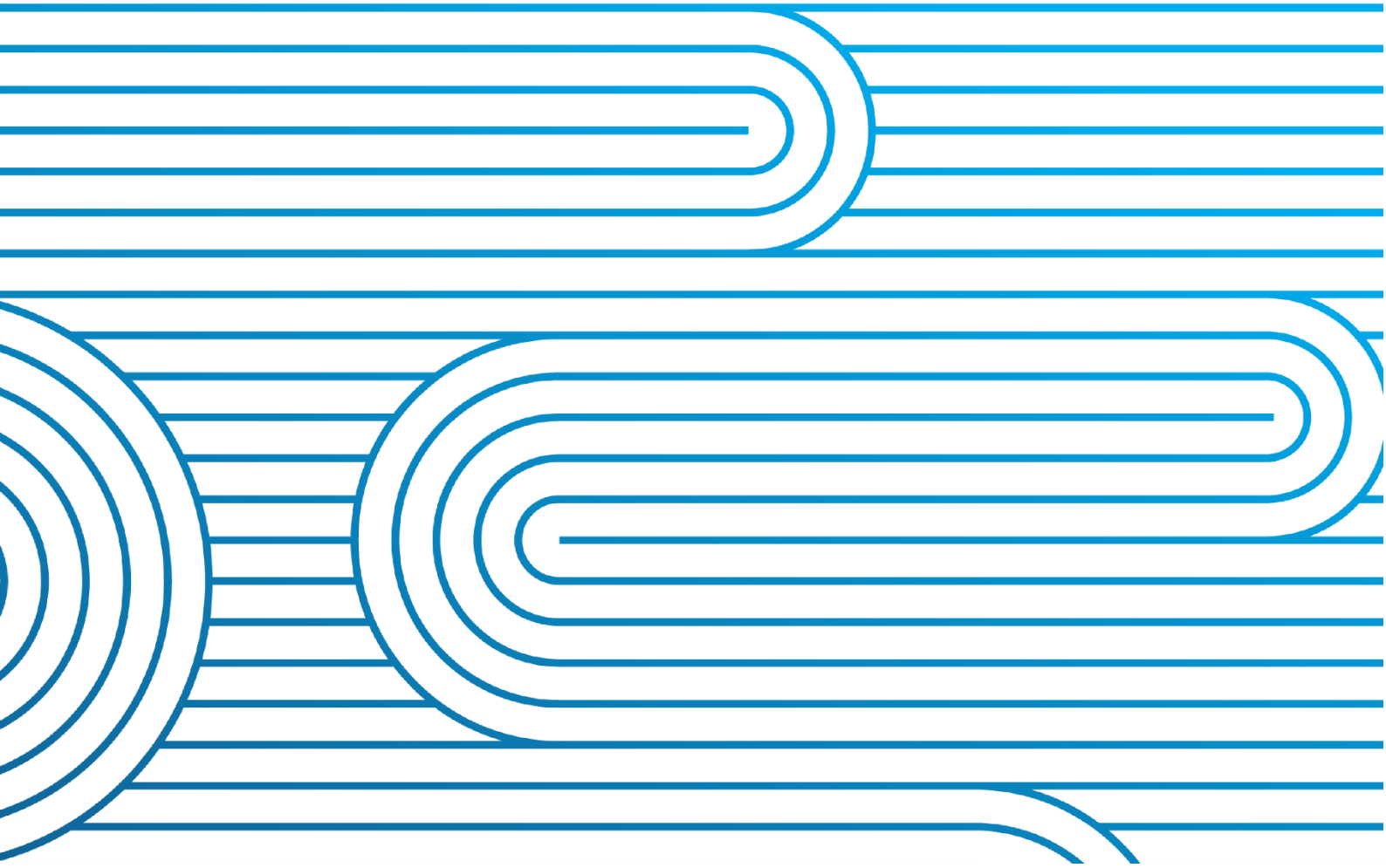
TRANSPOWER

2026 System Operator Engineering Forum

Questions and Answers

1 July 2026



IMPORTANT

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Introduction

The System Operator Engineering Forum on 1 July 2026 focused on "The CACTIS in Practice" – the CACTIS being the Connected Asset Commissioning, Testing, and Information Standard which came into effect the same day. Industry participants in attendance asked questions in response to the presentations given by the Electricity Authority and System Operator teams.

This document captures those questions and the answers given. We have organised them based on the themed sessions that they connect to.

If you have any queries about these answers, please contact compliance@transpower.co.nz.

Contents

1. Part 8 Code Amendment Changes

Question 1: *(Darren O'Neill, NewPower)*

Regarding the frequency deadband change to 0.1 Hz at the next regular testing period; is there any concern about the first few generator stations to make the deadband change will have to do the whole response between 0.1-0.2 Hz for the whole system? Is a more co-ordinated deadband change required?

Answer:

Requiring the change at the next routine test strikes a balance between achieving the desired responsiveness and avoiding significant upfront costs for all generators at once. Not all generating stations currently operate at the edge of their deadband settings, so it is unlikely that a single station would carry the entire burden of response during the transition period. The System Operator is reviewing frequency performance and may consider further changes in future if required.

Question 2: *(Gerard Demler, Contact)*

Is there a template for the distributor agreement re: excluding reactive power obligations of the Code?

Answer:

No. There is no prescribed template, but generators should provide evidence of the agreement with the distributor, such as a letter or documented agreement, and record the arrangement in the Asset Capability Statement where applicable.

Question 3: *(Enrique Trabajo, Elecnor)*

How does the Code, and in particular voltage regulation obligations, apply to generating stations when the generating units are disconnected? E.g. a solar farm during the night. Follow-up question: what are the obligations then with regards to quality of electricity generated in particular harmonics?

Answer:

The System Operator has visibility of compliance where generators connect to the transmission grid or a local network. If you electrically disconnect at this point of connection, the voltage obligations would not apply. The Authority has taken an action to form a view whether or not electrically disconnecting somewhere other than at this point of connection

would still attract voltage obligations. The Authority is also considering options regarding harmonics – see the Authority's consultation paper on options to address a harmonics issue. At present, harmonics obligations exist under:

- the Electricity (Safety) Regulations 2010 – specifically *Regulation 31 (Requirements relating to quality of supply)*
- Schedule 12.6 (Default Transmission Agreement Template) of the Code – specifically *clause 4.7 of Schedule 8 (Connection Code) of the Default Transmission Agreement Template*
- Part 6 of the Code – specifically the simplified one-stage application process in Part 1A of Schedule 6.1. (Part 6 of the Code also empowers distributors to specify, via their connection and operation standards for distributed generation, a harmonics standard for distributed generation connecting, or connected, to their networks – see, for example, clauses 6.1(a), 6.2, 6.3(2) of the Code, clauses 1D, 3(2), 9F and 18(2) of Schedule 6.1 of the Code, and clauses 3 and 11 of Schedule 6.2 of the Code.)

Question 4: *(Duncan Kaniaru Maina, AECOM)*

Please clarify the reactive power requirement for generation connecting to Transpower 33 kV or 11 kV buses. Currently the Code mentions generating unit terminals as the point of compliance.

Answer:

As indicated in the Policy Statement, the point of compliance verification is at the LV winding of step-up transformers, where they exist. The Electricity Authority is considering whether to move the point of MVAr compliance verification from the generating unit terminals to the point of connection to the transmission grid (on the high voltage side of the connection transformer). See pages 33–35 of the Authority's Issues and options paper on BESS-hybrid plants.

Question 5: *(Mufid Altorok, Ergo Consulting)*

Do all embedded generation units above 10 MW need to operate in Volt/VAR control to comply with +/-33% reactive power supply even though they may operate in constant power factor?

Answer:

No. Volt/VAR control is the default requirement only if no alternative arrangement has been agreed with the distributor. A generator and distributor can agree to another control mode, including constant power factor or unity power factor operation, and that agreed arrangement then applies instead of the default voltage control requirement.

Question 6: *(Mandeep Kaur, Powerco)*

How can we ensure that distributors and Transpower work together effectively in both Grid Owner and System Operator roles for compliance? Is the connection at distribution leading to additional compliance requirements and two timeframes to adhere to, in addition to the connection deadline?

Answer:

Each participant must look after their own Code compliance. The connection at distributor level does not change generator compliance, which is discussed directly between the generator asset owner and the System Operator. However, this does mean that the distributor must maintain contractual arrangements with the Grid Owner.

For clarity on generation commissioning timeframes, see Chapter 1 of CACTIS – these are Code mandated.

For embedded generation, distributors retain responsibility for managing voltage performance on their networks and may agree alternative voltage control arrangements with generators or direct generators to operate in a different control mode if needed. Within a distribution network, the distributor has priority when it comes to voltage mode and reactive power capability.

Question 7: *(Bryan Dimayuga)*

What would be the distributor obligations for small generators having a total sum of greater than 10MW?

Answer:

The distributor obligation would be to update their Distributor ACS and advise of the presence of the generation. The generator asset owner would need to talk to the System Operator directly. Contractually, the distributor would need to manage any benchmark agreement requirements with the Grid Owner.

Question 8: *(Jose Lumbera, Northpower)*

If the voltage obligation will not be met, does the Code give guidance to dispensation?

Answer:

Relief may be available through legacy arrangements, exemptions, dispensation arrangements where the relevant criteria are met. Asset owners are expected to assess their

ability to comply and engage with the System Operator where compliance is not achievable under the existing requirements.

2. Legacy Clause Provisions

Question 9: *(Nathaniel Cortes, Mercury)*

Regarding the statement, "A less than 5 MW increase doesn't affect a plant's legacy status," does this mean efficiency gains that increase output won't remove legacy status or trigger compliance with newer Code requirements?

Answer:

Yes. A legacy generating station can increase its capacity by up to 4.99 MW without losing its legacy status. This provision was introduced specifically to avoid minor increases in output, including those resulting from efficiency improvements, automatically triggering compliance with newer requirements.

Question 10: *(Amir Bader, APD Global)*

Could EA/SO please outline their understanding of the modification threshold deciding whether or not legacy assets fall under the new >10 MW obligations? i.e. how if/how many control parameters, additional equipment, etc?

Answer:

A 10 MW to 29.99 MW generating station or embedded generating station that has legacy status as an excluded generating station loses that status and is subject to > 10 MW obligations from the date—

a) a modification is made to the station that means it is able to comply with all the requirements it would be subject to if it was not an excluded generating station; or
b) the station's maximum continuous MW output power increases by 5 MW or more above its maximum continuous MW output power immediately before 1 July 2027.

(See clause 8.21 of the Code.)

An asset with legacy status for CACTIS obligations loses that status and is subject to CACTIS obligations from the date a modification/change is made to the asset that results in a 5% or greater change to the asset's—

a) MW rating; or
b) frequency response curve for 100 milliseconds or longer; or
c) voltage response curve for 100 milliseconds or longer.

(See clause 8.75 of the Code.)

Question 11: *(Aaron Forde, Meridian)*

The deadband requirement has no legacy provision for accepting previous deadband settings that fall outside the +/-0.1Hz requirement. Does this now require a dispensation path to acknowledge these settings?

Answer:

Yes. Existing generating stations are required to move to the new deadband requirement at their next routine test unless another arrangement applies. Where compliance is not achievable, a dispensation or other relief mechanism may need to be pursued through the existing Code processes.

Question 12: *(Gerard Demler, Contact; Ashley Wall, Electricity Risk Solutions; Ziyaad Domingo, MMDMM Engineering)*

Are there specific fields that you need to update your ACS with re: legacy arrangements and the legacy clause application form?

Answer:

Asset owners should ensure their ACS is up to date. Asset owners of existing stations (connected before 1 July 2026) must then attach a completed Legacy Status Note to it, alongside supporting documentation as indicated within the note. The names of each file must be as indicated in the note.

When completing your application form (for stations connecting between 1 July 2026 and 1 July 2027), there is space to attach a letter or similar written evidence confirming that the relevant legacy criteria have been met. Additional information may be requested if further verification is required.

Question 13: *(Nathaniel Cortes, Mercury)*

Could the Authority kindly clarify what the Code means by "generating station"? Does it refer to each individual generating unit or to the entire station, noting that some stations comprise multiple generating units?

Answer:

The Code's definition reads "generating station means 1 or more generating units that are directly connected to the (transmission) grid or to a local network and that inject into the (transmission) grid or a local network (as the case may be) at a single point of injection."

Question 14: *(Darren O'Neill, NewPower)*

What happens when an asset owner who has commissioned plant doesn't know if it can comply without modification? Does it need to do additional studies and testing to check? Mainly thinking about fault ride through, as this depends on network strength etc.

Answer:

Asset owners are responsible for assessing whether their assets comply with Code requirements. Where compliance is uncertain, additional studies, modelling, or testing may be needed to demonstrate compliance or to support an application for legacy status, exemption, dispensation, or another form of relief.

Question 15: *(Mao Reyes, Transpower as Grid Owner)*

CACTIS reads generator-centric in places but the grandfathering clauses seem asset-based, and sit in Part 8 of the Code and are not limited to generators. Could you confirm if grandfathering applies to other asset owners like transmission grid owners or distributors?

Answer:

The legacy provisions are asset-based rather than generator-specific. They can apply to other asset owners where the relevant CACTIS obligations apply, and the asset meets the qualifying criteria for legacy clause provisions.

Question 16: *(Darren O'Neill, NewPower)*

What is the intention of the CACTIS legacy clause? The clause wording doesn't seem quite fit for purpose. Unsure how this legacy clause applies to studies, modelling, commissioning, testing, high speed recording. Do existing generation stations need to update these?

Answer:

The intention of the legacy clause is to avoid retrospectively applying new requirements to existing assets that were designed, procured or connected under previous rules. Existing assets are not automatically required to upgrade systems, models, testing arrangements or monitoring equipment unless the relevant CACTIS obligation applies to them, they lose legacy status, or they undertake modifications that trigger the new requirements.

Question 17: *(Ziyaad Domingo, MMDMM Engineering)*

Does electrically connected by 30 June 2027 mean that the site needs to be fully commissioned and at full export capability by this date? If the site only achieves partial export capacity by 30 June 2027, then would it still qualify for legacy clause exemption?

Answer:

Legacy eligibility is linked to the timing of electrical connection rather than achievement of full export capacity. A generating station that is electrically connected before the relevant deadline can qualify for legacy provisions if it satisfies the applicable criteria.

Question 18: *(Brad Henderson, Lodestone)*

Do ALL existing assets e.g. connected to the grid in 2025 or earlier need to submit a legacy note to ACS?

Answer:

No. A legacy note is only required where an asset owner intends to rely on a legacy provision. Assets that are already compliant with the applicable requirements do not need to submit a legacy application simply because they existed before CACTIS came into force.

Question 19: *(Brad Henderson, Lodestone)*

Does the unavailability of a model e.g. TSAT constitute a "modification" for the purpose of the legacy status?

Answer:

The unavailability of a TSAT model for generating stations eligible for legacy provisions constitutes a valid reason to seek legacy status.

If the generating station loses its status due to a modification, then a TSAT model may need to be provided. Modifications relate to changes to the asset, its equipment or its capabilities rather than the availability of supporting modelling artefacts.

Question 20: *(Andrew Hall, Mercury)*

Why do asset owners have to apply for legacy instead of it being automatically granted for existing generators?

Answer:

Asset owners are required to apply so that the System Operator can verify that the asset qualifies for legacy treatment and maintain an accurate record of assets relying on the legacy provisions. This also provides clarity about which requirements apply to each asset.

Question 21: *(Mandeep Kaur, Powerco)*

How would capacity additions be treated?

Answer:

A capacity increase of 5 MW or more, or 5% or more (depending on the particular legacy provision) would result in a loss of legacy status (as the Authority decision papers linked on our CACTIS webpage indicate – see clauses 8.21 and 8.75 of the Code). A capacity increase less than these thresholds would not affect legacy status.

Question 22: *(Steve Leppien, Genesis)*

What is the process for an asset with a legacy status note, that has an upgrade <5 MW, to maintain the legacy status?

Answer:

The asset owner should update the Asset Capability Statement to reflect the change and maintain evidence that the upgrade remains within the <5 MW allowance. Provided the increase is less than 5 MW and no other relevant triggering modification occurs, the asset can retain its legacy status.

Question 23: *(Aaron Lin, APD Global)*

As we work through the revised requirements and consider these against plant state and historical information available, we feel providing accurate information to support the legacy note deadline will be challenging. Is there an option to extend this deadline?

Answer:

Asset owners are encouraged to submit the available supporting information and evidence within the required time frame. Extending the deadline via a Code change would take a significant amount of time and would not be a tenable solution in this case.

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3. Connection Study Requirements

Question 24: *(Richard Fairbairn, Ergo Consulting)*

Would an 11 MW embedded generator have to complete an entire suite of FRT studies. Further, what additional System Operator studies would be required within GL-EA-953?

Answer:

Generating stations between 10 MW and above but less than 30 MW can demonstrate compliance with the fault ride-through (FRT) requirements against the Code FRT curve using a "Single Machine Infinite Bus" model rather than undertaking the full testing and validation requirements that apply to larger generating stations. As for the additional study requirements, see CACTIS Chapter 5.

Question 25: *(Brad Henderson, Lodestone)*

Can you clarify voltage range 8.22 obligations for embedded generators? Is the voltage range instead determined by the distributor?

Answer:

Clause 8.22 requires a distributor to ensure that its local network is capable of being operated, and does operate, when the transmission grid is operated over the range of voltages set out in clause 8.22. To enable it to meet this obligation, a distributor may need to determine a voltage range for an embedded generating station.

Question 26: *(Gerard Demler, Contact)*

Is the point of connection for embedded generation the ownership boundary?

Answer:

Not necessarily. The point of connection is determined by the connection arrangement and network configuration, not simply by asset ownership boundaries.

Question 27: *(Gerard Demler, Contact)*

If you have multiple new generation connections in the same region, can the connection studies be combined across the multiple asset owners?

Answer:

Connection study, modelling, and compliance obligations are the responsibilities of each generating station owner. If asset owners can agree to combine resources, the System Operator is willing to look at the possibility of combined connection studies across multiple asset owners, provided that the distinct performance obligations for each asset owner can be demonstrated reliably.

Question 28: *(Richard Fairbairn, Ergo Consulting)*

If the study requirements are extended (e.g. to a 3-year horizon for power flow), when will an updated EMI PowerFactory grid model be released? The present version has cases to 2027?

Answer:

The new PowerFactory cases have been uploaded on the Electricity Authority's website: https://www.ea.govt.nz/data-and-insights/datasets/wholesale/transmission/power-system-analysis/powerfactory-case-files/. These are updated yearly.

Question 29: *(Nathaniel Cortes, Mercury)*

If an existing station achieves an output uplift of ≥5 MW (e.g. through process optimisation, reduced parasitic load, increasing available head), would the station be required to undergo the full suite of studies? Considering there are no changes to the electrical parameters of the components.

Answer:

Assuming the station has legacy status approved, a capacity increase of less than 5 MW would not affect legacy status. Once the increase reached or exceeded 5 MW, the legacy protection may no longer apply and the asset may become subject to the relevant current Code requirements, regardless of whether the increase was achieved through optimisation or physical equipment changes. Whether the asset owner would then be required to conduct a full suite of studies would depend on the nature of the change and their impact. The SO suggests talking to us on a case-by-case basis for further consideration.

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4. Testing Requirements

Question 30: *(Will Thomas, Meridian)*

How can both parties agree on a set of testing on a case-by-case basis to accommodate the testing capability of existing systems? If a system is not capable of being tested in the manner prescribed by the SO, can an equivalence be made by the agreed engineering methodology?

Answer:

Where an asset cannot comply with a testing requirement set out in guideline documents, the asset owner can propose alternate methods of testing in their engineering methodology document. The System Operator will then review this and provide feedback.

Question 31: *(Gabriel Lim, Powerco)*

Are there testing requirements to be fulfilled at the commissioning of new generators connecting to a distributor's network, and should distributors involve the SO during the commissioning to ensure testing is compliant?

Answer:

Yes. New generators connecting to distributor networks must comply with the applicable commissioning, testing, modelling and performance requirements set out in the CACTIS and Part 8 of the Code. The generator asset owner needs to coordinate requirements with affected parties such as distributors, connected loads, and sometimes the Grid Owner.

5. Modelling Requirements

Question 32: *(Amir Bader, APD Global)*

Could you please talk a little on your expectations for model validation with respect to PSCAD and TSAT models? Particularly for events post-commissioning?

Answer:

Post-commissioning, asset owners are expected to provide a validated model based on commissioning test results – this applies to PowerFactory, PSCAD, and TSAT models. If a subsequent power system event shows that the model does not accurately represent plant

performance, the System Operator may require the model to be updated and re-submitted. For ongoing equipment changes or routine testing activities, asset owners are expected to confirm that the model remains valid or revalidate it where necessary.

Question 33: *(Ziyaad Domingo, MMDMM Engineering)*

In the EA decision paper (dated 31 March 2026) they mentioned that they've engaged with various OEMs regarding their capability to provide TSAT models, but they don't mention which OEMs were contacted. Is it possible to know which OEMs have confirmed that they can provide TSAT models?

Answer:

The Authority will follow up with the OEMs and seek permission to publicly identify which vendors have confirmed their ability to provide TSAT models.

Question 34: *(Brad Henderson, Lodestone)*

Can you please discuss the option (assuming it exists) of instructing the SO to develop the TSAT model? I.e. the developer pays the SO instead of procuring the model directly.

Answer:

The System Operator cannot develop the OEM-specific TSAT model itself, as the underlying model must be obtained from the original equipment manufacturer. However, there may be the possibility that the System Operator provides benchmarking or validation services on a cost-recovery basis. The Authority is investigating what policy and regulatory clarifications may be needed to enable this.

Question 35: *(Vimeshan Pillay, APD Global)*

Can you please clarify the Impedance provision requirement. Is it frequency dependent and if so what is the frequency range of interest?

Answer:

No. The impedance information required under the guideline is a steady-state impedance based on power-frequency conditions. Frequency-dependent impedance data is not currently required.

Question 36: *(Michael Hwang, Meridian)*

Could you clarify the TSAT model submission requirements? I thought TSAT models could be supplied directly from OEM to SO without validation against test data if initially benchmarked by the OEM against PSCAD/PF. SO will integrate the TSAT models if needed, like PPC and Inverter from 2 OEMs?

Answer:

The TSAT model must ultimately be benchmarked against a validated PSCAD model. The asset owner is responsible for providing a complete and functional TSAT model and for integrating equipment models from different vendors where necessary. Due to resourcing constraints, the System Operator is unable to undertake the task of combining separate OEM models into a site-specific TSAT model. Where multiple vendors are used, the responsibility for ensuring that the plant controller, inverter models and supporting network representations work together remains with the asset owner.

Question 37: *(Jeremy Hill, APD Global)*

Is the intention of the PSCAD models in a WAN environment for assessment of system stability and identification of adverse system interactions? If so, can this be completed if OEM models are confidential and synchronous machine models in PSCAD WAN are not required? Or will this be considered later?

Answer:

Yes to the first question – this is one of the intentions. As for the second question – the System Operator has PSCAD models available for synchronous generating assets.

Question 38: *(Richard Fairbairn, Ergo Consulting)*

Can the system operator make its TSAT software available to its preferred consultants?

Answer:

The System Operator acknowledges that demand for TSAT software and expertise will increase due to the updated modelling requirements. Sharing TSAT software licenses with consultants may not be possible under the current licensing agreement with PowerTech (the provider of DSATools such as TSAT), but the System Operator is investigating the possibility.

Question 39: *(Kevin Johnson, Meridian)*

For the legacy wind sites, given the age it is extremely difficult to work with OEMs to procure the updated models or the latest versions within the requested time frame. How does the SO recommend generators address this? Is a formal dispensation the expected pathway here?

Answer:

If the wind sites have CACTIS legacy status, they would not have TSAT modelling requirements. If legacy status is lost, the requirements would then apply. As in other situations, if an asset owner is non-compliant with the Code, then the current mechanisms to manage the non-compliance will still be available.

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6. Operational Communications and High-speed Data Requirements

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Question 40: *(Andrew Hall, Mercury)*

Can we change wind speed to m/s instead of km/hr as this is its native format?

Answer:

The System Operator will investigate this – and potentially implement this in the next review of the CACTIS. Until then, we recommend asset owners perform the applicable conversion.

Question 41: *(Darren O'Neill, NewPower)*

How soon do asset owners need to provide the new ICCP signals required by CACTIS? Assume ICCP outages will be staggered between asset owners

Answer:

For existing and committed assets, the additional operational communications data must be provided through the ICCP dataset, unless relief is obtained through the legacy provisions (other than for controllable load indications). New assets are required to comply with the CACTIS Chapter 8 requirements from the outset.
For distributors and directly connected loads needing to provide new controllable load indications, the deadline is 1 July 2027.

Question 42: *(Mike Myhill, Transpower)*

Can we confirm which customers need to provide the controllable load indications?

Answer:

Controllable load indications are required from connected asset owners that are distributors (EDBs) and loads directly connected to the transmission grid. The required information includes controllable load available, controllable load currently off, and interruptible load currently armed, generally at a GXP level unless otherwise agreed with the System Operator.

Question 43: *(Nathaniel Cortes, Mercury)*

Regarding high-speed data recording, if at the moment the station has unit level data, does it still need to provide a station level high speed data recording?

Answer:

Yes. The Chapter 9 requirements are defined at the generating station level and require generating station active power, reactive power, frequency, and transformer high-voltage measurements to be recorded and made available for event analysis. If you wish to submit unit-level data, all the station's individual generating units must have low-voltage high-speed data recording capabilities.

The System Operator may adjust this requirement in the next review of the CACTIS.

Question 44: *(Aaron Forde, Meridian)*

Some of the indication points are at a 'station level'. For many of our sites the station level HV indication, switchyard, is owned by the GO. Do you require the indication from this point or AO LV indication?

Answer:

The asset owner can request the Grid Owner to provide the information on their behalf as long as it is to the correct quality. Note that the obligation to provide accurate data remains with the asset owner.

Question 45: *(Mandeep Kaur, Powerco)*

What is the expectation for distributors and Transpower working together to coordinate the ICCP requirements?

Answer:

The Operational Data Integration process describes requirements to work with Transpower.

Question 46: *(Nathaniel Cortes, Mercury)*

For clarity, could we kindly detail what we mean by frequency/voltage control mode (enabled/disabled) on the new ICCP points required?

Answer:

The requirement is intended to indicate whether the generating station's frequency control mode and voltage control mode are currently active or inactive. The System Operator included these signals as additional operational indications so operators can determine which control functions are enabled at any given time.

7. Miscellaneous

Question 47: *(Sarel Peens, Harmony)*

Has Transpower received any update from the EA regarding the harmonics legislation and the potential change from NZECP 36 to AS/NZS 61000?

Answer:

Yes. The Electricity Authority has completed consultation on three options for updating the regulatory arrangements governing the management of harmonics on New Zealand's power system and received around 15 submissions. The feedback showed strong industry support for moving away from NZECP 36:1993 and instead requiring compliance with the AS/NZS 61000 series for transmission and distribution networks. Discussions with MBIE and WorkSafe are ongoing, and any Code amendment proposal would first require policy work to be completed.

Question 48: *(Bryan Dimayuga)*

Do we still need ACS for 1MW or greater for embedded generation?

Answer:

Yes, an ACS is needed for any generating unit of 1 MW or greater. This page on the System Operator website provides a good summary of obligations depending on connection/capacity/type: https://www.transpower.co.nz/system-operator/information-industry/asset-owner-requirements/commissioning-generation