



Electricity Authority
By email fsr@ea.govt.nz

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Addressing common quality information requirements

Transpower welcomes the opportunity to submit to the Electricity Authority's (Authority's) parallel consultations for Part 8 Code amendments and Information provision, published 1 October 2024, under the Common Quality Requirements Review programme. This submission is on information provision, from Transpower in both its roles as system operator (SO) and grid owner (GO).

The complexity of system operation and effects on the grid security have increased, and will continue to increase, as more inverter-based resources (IBR) are connected to the grid. Any barrier to GO and the SO getting critical modelling information increases the risk that interactions between connected resources will lead to unpredictable and potentially catastrophic outcomes.

Information Provision to SO and GO is codified under Parts 8 and 12

Option 3 is the only option that meets existing policy settings under the Code for information provision to the SO under Part 8 and GO under Part 12,¹ and promotes the Authority's statutory objective.

This option can clarify the nature of the asset capability statement (ACS) information both to SO and the GO – including the generator models - and remove the duplicative provisions that hinder efficient operation. The Authority describes option 3 as building on option 2 [the SO and EDBs share common quality information] which in turn builds on option 1 [update and clarify common quality information in the Code]. An additional option would be to permit the GO only to access the ACS information and models held by the SO. This approach would still create the advantages listed for option 3.

Transpower supports option 3, *to allow the system operator to share common quality-related asset information with Transpower, as a transmission network owner, to enable Transpower to meet its common quality obligations under the Code.*

¹ This is specified in **Connection Code 2.1 Requirements for equipment capability** As and when the Customer must provide an **asset capability statement** to the **system operator** under the Code, the Customer must also provide the same **asset capability statement** to Transpower (in the same manner in which it provides the asset capability statement to the system operator) but including the information specified in clause 2.2 (b), (c) and (d).

For all the options, provision must be made for how to keep commercially sensitive information confidential. This should remove any need for non-disclosure agreements (NDA) between connected parties and the SO and GO.

Modelling information is key to managing security and resilience.

The consultation paper conveys the extensive research the Authority has undertaken to gauge what is happening in other jurisdictions around modelling information to better understand how IBR respond to faults.² We support the Authority proactively monitoring developments and solutions from overseas.

Transpower's strong preference is to receive unencrypted models through ACS provision and updates. Unencrypted models would allow SO and GO to identify e.g. which control block is causing problems; and to re-compile the model as needed when simulation software is upgraded. This outcome would lead to more efficient and reliable outcomes compared to receiving fully encrypted models. Partial encryption, for which the adjustable parameters are clear, but some parts of the model remain encrypted, could be used to manage any proprietary intellectual property concerns.

We note the description at paragraph 3.35³ about the ownership and use of a "real-time digital simulator," is incorrectly attributed to the SO. It is the GO that owns and uses it.

GO process for obtaining the required information, support a more efficient way

As the Authority identifies, Transpower in its GO role has to seek authorisation from each grid connected customer to allow the GO to access the information that the customer has already provided to the SO. We agree with the multiple advantages ("pros") listed for option 3⁴ that would flow from permitting the SO to share the ACS information with the GO.

Option 3 - or the additional option we have suggested - should have operational efficiency benefits across all participants, and significant system performance benefits through higher-value modelling information. These options, may, however, require some investment to enable secure sharing of information between the different parties.

Concerns raised in the consultation can be resolved

The Authority writes "*Manufacturers of IBR equipment are concerned that third parties might be able to reverse-engineer information contained in encrypted models, potentially compromising the manufacturer's intellectual property.*"⁵ AECOM, consulting for the Australian Energy Market Operator (AEMO), considered this concern and concluded that the "*risk of back solving black boxed models is extremely low.*"⁶ We consider the concern can be addressed and managed, rather than it being a barrier to accessing the model information that supports accurate understanding of system performance from IBR and synchronous operations.

² Refer footnotes 13 – 16 page 15 of the consultation paper.

³ In New Zealand, the system operator owns and maintains a real-time digital simulator, using it to verify Code and setting changes in assets connected to the power system, conduct modelling and simulation studies, answer questions raised by the system operator, and to validate models.

⁴ Paragraph 5.23 of the consultation paper.

⁵ Paragraph 4.11 of the consultation paper.

⁶ [EMT and RMS Model Requirements \(aemc.gov.au\)](https://www.aemc.gov.au/EMT-and-RMS-Model-Requirements)

We consider a concern that OEMs may leave the NZ market⁷ needs to be viewed in a global context where all jurisdictions are grappling with the changed performance characteristics of synchronous and higher inverter-based generation, and needs for better modelling information.

Finally, we consider that any perceived conflict of interest between Transpower as GO and SO is not material in relation to Option 3. Currently the Code already contemplates the same information provided to the SO is also provided to the GO.⁸ In addition, Transpower does not own generation assets or trade electricity.

Yours sincerely

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Head of Regulation

⁷[(b) *There is the risk that original equipment manufacturers may threaten to discontinue, or indeed discontinue, the provision of their equipment to the New Zealand market if they do not want to provide Transpower, as a transmission network owner, with proprietary asset-related information required under the Code.*

⁸ Part 12 Schedule 12.6, Connection Code clause 2.1.

Appendix A – Response to Information Provision

Question	Response
<p>Q1. Do you agree with the key drivers of change in power system modelling requirements identified in this section? If you disagree, please explain why.</p>	<p>Yes. The drivers of change for system performance and understanding are summarised well, in particular:</p> <ul style="list-style-type: none"> • emerging new power system issues due to new and evolving technologies • the specialised EMT (electro-magnetic transient) modelling requirements for inverter-based generation differ from traditional technologies that use standard RMS (root mean square) models • learnings from overseas jurisdictions on the need for accurate and up-to-date models to test potential interactions between power electronics (IBR) resources, and between those resources and the network.
<p>Q2. Are there any other drivers of change in power system modelling requirements which are not covered in this section? If so, please elaborate.</p>	<p>Power system modelling has become more complex because of the potential for IBR interactions that can only be assessed using EMT models. Power system behaviours will change as the uptake of IBR increases.</p> <p>From a GO perspective these models will be needed for the following interactions</p> <ul style="list-style-type: none"> • grid enhancement investigation dynamics studies • generator controller Interaction studies with Grid equipment • HVDC / power electronics controller conceptual design and tuning • Power quality studies (harmonic, transients) compliance, monitoring and investigations <p>From a SO perspective, we need both EMT and RMS models to analyse and understand how more IBRs will affect power system behaviour. The SO needs to</p> <ul style="list-style-type: none"> • study dynamic behaviour of the system to forecast potential security issues, • understand control system interactions • perform compliance assessments and undertake post-event analysis.
<p>Q3. Do you agree with the Authority's elaboration on the common quality-related</p>	<p>Yes, we support the Authority's general position that <i>the system operator, distributors and Transpower, as a transmission network owner, have insufficient <u>information on assets</u> wanting to connect, or which are</i></p>

<p>information issue set out in this section? If you disagree, please explain why.</p>	<p><i>connected, to the power system to provide for the planning and operation of the power system in a safe, reliable and economically efficient manner.</i></p> <p>The elaboration rightly refers to both 'information' <u>and</u> 'models.' As GO and SO asset information and models are critical to enabling us to plan, build, and operate the grid. However, we are unsure of the value of the models to the distribution network.</p>
<p>Q4. Do you agree that the current provisions in the Code are insufficient to address the common quality-related information issue described in this section? If you disagree, please explain why</p>	<p>The Code already provides that asset owners connecting to the grid must supply ACS to both the SO and the GO, in the format prescribed by the SO. The Code also provides (Connection Code (clause 2.2) that the GO can request modelling information in addition to what an ACS covers.</p> <p>Existing provisions could be clarified and potentially enhanced. Care is needed to not constrain information requirements by prescription in the Code, in an evolving technological environment. What is reasonable to request could be developed through a consultation process based on an industry - shared understanding of the SO and GO need for and use for the information.</p>
<p>Q5. Do you consider there to be any other aspects of the common quality-related asset information issue that are not covered in this section? If so, please elaborate.</p>	<p>Another aspect is the level of encryption when providing models – whether they are wholly encrypted or, unencrypted; or can be partially encrypted, in which case the adjustable parameters are clear, but some parts of the model remain encrypted). Partial encryption could be used to manage some proprietary IP concerns.</p> <p>As SO, we require some additional operation for real time operations such as some internal plant indications. The FSR consultation process could also review Part 8 Technical Code C.</p>
<p>Q6. Do you agree with the shortlisted options presented by the Authority? If you disagree, please explain why.</p>	<p>Yes. The options could be developed with considerations such as</p> <ul style="list-style-type: none"> • clarity on what is asset information (i.e. ACS data vs asset models.) • how the SO, GO and/or EDBs are to protect the asset information data and models, to remove the need for non-disclosure agreements with OEMs. In Australia, obligations to protect information have been adopted. <p>An additional option is whether to enable the SO to share models with the GO, but not the EDBs. This approach could practically manage and maintain confidentiality, but minimise duplication of information provision at different stages of the connection processes.</p>

<p>Q7. Do you have any feedback on the desirability of a document <i>Addressing common quality information requirements</i> incorporated by reference in the Code specifying various common quality-related information requirements?</p>	<p>We strongly support this idea, as clarity in the requirements will remove ambiguity. Clarity would be obtained for both modelling and asset capability information. In our view the key area is clarity of model requirements.</p> <p>Ideally the document needs to be able to be updated without that update being a Code change (accepting that any proposed change should require notification and consultation). This approach would align with the Authority's view that the SO has the subject matter expertise, knowledge and understanding of the information it needs. This expertise and knowledge is true for the GO too.</p> <p>The objective for the document is that the information within it is deemed "reasonably required," and what is reasonable should be consistent with existing Code policy under Part 8 (for SO needs) and the Connection Code (for GO needs). What is reasonable to request could be developed through a consultation process based on an industry - shared understanding of the SO and GO need for and use for the information.</p>
<p>Q8. Do you agree with the pros and cons associated with each option? What costs are likely to arise for affected parties (e.g., asset owners, network operators and network owners) under each of the options?</p>	<p>Yes..</p>
<p>Q9. Do you consider any perceived conflicts of interest under the second and third shortlisted options to be material in nature? If so, please elaborate</p>	<p>We agree there could be a perceived conflict of interest, if EDBs can access unencrypted, or partially unencrypted EMT models, as they are owners (or future owners) of generation.</p> <p>We consider that any perceived conflict of interest between Transpower as GO and SO is not material in relation to Option 3. In addition, Transpower does not own generation assets or trade electricity.</p>
<p>Q10. Do you propose any alternative options to address the common quality-related information issue? If so, please elaborate.</p>	<p>An additional option would be to permit the GO only to access the ACS information and models held by the SO. This approach would enable the existing Code to be more efficiently applied.</p>
<p>Q11. Do you agree with the Authority's high-level evaluation of the short-listed options to help address the common quality-related</p>	<p>We consider neither option 1 nor 2 fulfil current Code policy for the scope of information that should be provided to the GO as well as the SO, nor do they cover the necessary step-up for the type (EMT and</p>

information issue? If you disagree, please explain why	RMS) and detail of models now required for assessing IBR performance on the grid, for both the SO and GO. The only evaluation criterion that presents different conclusions is the first one.
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