TRANSPOWER

New Generation – Summary of System Operator Interactions

Transpower performs both Grid Owner and System Operator roles within the New Zealand electricity system. The following information summarises how customers considering new generation with a unit size greater than 1MW need to engage with Transpower as System Operator irrespective of whether connection is to distributor or Transpower assets.

The level of engagement is dependent on the stage of your project

Feasibility

For the purposes of this document a project is at the "feasibility" stage when:

- You are working on your project, but
- Any of the 'planning' milestones below are not met

Planning

For the purposes of this document a project is at the "planning" stage when the following milestones have been met:

- Land acquired, and
- Consents, construction approvals, licences obtained, and
- Construction either started or firm dates known, and
- Financing arrangements and approvals complete, and
- Connection location known, and
- A "planning" Asset Capability statement is lodged, with sufficient information to carry out a compliance assessment in line with the points listed later in this document. The accuracy of our assessment is dependent on the accuracy of the information we are supplied, noting our review does not relieve the asset owner from complying with their obligations under the Code.

Pre-commissioning

For the purposes of this document a project is at the "pre-commissioning" stage when the following milestones have been met:

- Generation and connection design complete, and
- Major equipment specified, and
- Procurement contracts in place, and
- Construction started

Commissioning

For the purposes of this document a project is at the "commissioning" stage when the following milestones have been met:

- All major construction complete, and
- Testing and commissioning plans approved

Engagement during 'feasibility' stage

The System Operator is usually not involved during the feasibility stage of your project; however, you should be including operational considerations within the scope of your project. In the feasibility stage projects should be considered, and possibly assessed against matters that could include the following:

- Market Requirements
- Act, Code, Compliance Requirements
- Connection topology
- Connection Studies
- Considerations to export power if not consumed within a distribution network
- If connecting to a local network, power quality obligations of the Network Company at their point of connection to Transpower and any system support your generation will need to provide to support the network company to meet them
- If connecting directly to Transpower assets, power quality obligations within the benchmark agreement

As an asset owner, if you are not conversant with the Code or the Market you should seek advice from a suitably qualified consultant.

Engagement during 'planning' stage

Once you have confirmed your project and decided to proceed with the build, you will need to engage with the System Operator to provide technical asset information and to discuss commissioning (compliance@transpower.co.nz). General guidance on your obligations can also be found in the system operator's Resources for Asset Owners section. Prior to this you should familiarise yourself with the Code and electricity market in readiness.

Before the completion of planning for the construction of an asset (or configuration of assets) the System Operator can assess compliance with Asset Owner Performance Obligations (AOPO's) and Technical Codes, once supplied an Asset Capability Statement (ACS) and any other information reasonably required in the appropriate format.

While we can help you understand your obligations, you remain responsible for planning to meet, and meeting those obligations, from the planning stage of your project through to the end of your asset's life when it is decommissioned.

Transpower as System Operator will review your planning ACS. This is a case-by-case piece of work based on information supplied and will take into consideration where the generating station is to be connected and how that could impact our ability to meet our Principal Performance Obligations in steady state and for contingencies. It is generally a summary only but for significant projects, to be thorough, it could be done clause by clause against Part 8 subpart 2 and the relevant Technical Codes.

(The following is provided as a guide only of areas of System Operator interest. It is not intended to replace a thorough knowledge of the Code obligations and the Electricity Act 2010)

This review will typically examine several areas of compliance, including:

- Frequency Performance
    - If the generating station injects less than 30MW into a local network or the grid
        - the Code does not get to set performance requirements; however, the System Operator does need to know how the equipment will react to frequency and its trip settings
        - the System Operator can ask the Authority to issue a directive to comply with some or all of obligations relating to frequency or voltage ride through
    - If the generating station injects 30MW or more into a local network or the grid the Code sets the performance requirements
    - The closer you get to 30MW the more information we are likely to request about how the equipment will perform
    - Ideally asset owners should strive to meet clause 8.19 of Part 8 of the Code regardless of MW capability
- Voltage Support
    - If grid connected, the related technical codes need to be followed (voltage control, on-load-tap-changer etc). If distribution connected, we still need to know the nature of the connection and the voltage performance of the equipment. The bigger the station the more information we are likely to need.
    - If a point of connection exists then 8.22 and 8.23 apply regardless of MW output. Determining if a point of connecting exists is problematic, currently we carry out or review others' dynamic studies to form a view. This requires models and complete asset capability statements.
    - If the generating station injects 30MW or more into a local network or the grid, voltage ride through obligations apply.
- Information
    - If the generating unit size is 1MW or larger, an asset capability statement needs to be submitted.
    - If the generating station injects less than 30MW into a local network or the grid the System Operator can request some or all of Tech Code C to be complied with.
    - If the generating station injects 30MW or more into a local network or the grid then Technical Code C (Data, Document, and Voice Communications) applies in full.
- Trading Arrangements
  These apply whether assets connect to the grid or a local network if they wish to take part in the Wholesale Electricity Market directly:
    - If either a single station or a group of stations behind a GXP are embedded and > 10 MW, there are provisions in the Code for the System Operator / Electricity Authority to request the output to be offered. The need to offer is determined on a case-by-case basis, based upon topology and location of the generation.

- If either a single station or a group of stations are > 30 MW, the Code requires the output to be offered.
- There are special provisions for intermittent generators which include wind and solar.
- There are special conditions for co-generation participants.

Engagement during 'pre-commissioning' stage

If the generating unit size is 1MW or larger, an Engineering Methodology Document and a Commissioning Plan may need to be submitted to the System Operator for agreement.
An Engineering Methodology document must be prepared by the asset owner and agreed by the System Operator, providing an opportunity to finalise test details for review by interested parties in advance of model verification.

We suggest including an excerpt from Section 5 of GL-EA-010_Companion Guide for Testing of Generation Assets to identify signal measurement locations followed by the appropriate test sheets from the Appendices which can be customised to suit specific equipment. It is a key document for asset owners as it:

- Sets out the signals to be recorded and the refresh rate they should be recorded
- Allows equipment suppliers to confirm specific signals are available external to the equipment being tested

Provision of a preliminary mathematical model at this stage, complete with simulations of proposed tests, can assist asset owners by allowing a direct comparison of test results against the simulations during the commissioning phase.

A Commissioning Plan must be prepared by the asset owner and agreed by the System Operator, upon request a template is available. It is a key document for asset owners as it:

- Assists them to meet Code obligations
- Is used by the System Operator to identify and mitigate additional risks posed by unproven control systems during testing and commissioning

More information can be found in the System Operator's Resources for Asset Owners web page.

Leading up to commissioning and testing Operational Test Plans must be submitted in advance for approval by the System Operator before tests can be carried out. Details of the Planned Asset Testing Procedure and a Test Plan template are available on this web-page.

Market documentation will also be required for generation participating in the Wholesale Electricity Market.

Engagement during 'commissioning' stage

Once agreed, the Engineering Methodology; the Commissioning Plan and Operational Test Plans must be followed.

Where increased risk is being managed by the System Operator, testing to mitigate or remove secondary risk mitigation must be carried out as early as possible with test results reviewed by the System Operator before further commissioning can proceed.

More information can be found in the System Operator's resources-asset-owners