



# Utility-scale distributed generation process

Your guide to connecting renewable generation to the Powerco network



# Ngā Ihirangi

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## Whakatakinga

# Introduction

Powerco is here to connect communities. We're committed to helping Aotearoa achieve its net-zero by 2050 goal by enabling the sustainable energy transition by supporting the connection of renewable generation to our electricity network wherever possible.

This guide provides information on how we work with utility-scale distributed generation companies to connect to Powerco's high-voltage network.

It provides a high-level overview so you can familiarise yourself with the connection options, delivery paths and costs you'll encounter - from your initial inquiry with us, through the assessment, design and build phases.

This process applies to distributed generation projects that will produce 1MW or more.

Small (up to 10kW) and medium scale (10kW up to 1MW) connections - such as adding solar panels to your rooftop or small business - can be connected using our standard process. Your installer should be able to complete the application to connect with us on your behalf. More information on this process is available here:

[www.powerco.co.nz/get-connected/solar-power-for-home-and-business](http://www.powerco.co.nz/get-connected/solar-power-for-home-and-business)

## Code, policy and standards

We're governed by Part 6 of the Electricity Authority's Electricity Industry Participation Code which sets out the application procedures to efficiently enable distributed generators to connect to distribution networks like Powerco's.

We also have our own key guiding documents as follows:

- **Distributed generation policy**  
Our core principles regarding enabling the connection of renewable energy generation on our distribution networks.
- **Congestion management policy**  
Our principles relating to distributed generation load congestion management.

These documents are available to read on our website here:

<https://www.powerco.co.nz/get-connected/utility-scale-generation>

## Timeframes for enabling your connection

Designing and undertaking development on our network takes time, particularly for significant projects such as utility-scale generation and large industrial loads. Please contact us early in your planning process to help ensure we can enable your distributed generation project in a timely way.

## About Powerco

Powerco is a dual electricity and gas distribution owner and operator, serving customers across the North Island. On its electricity network, Powerco manages 28,441kms of overhead lines, underground cables and associated equipment, supplying 345,000 individual customer connections and approximately 736,000 customers.



## Tiro Whānui

# Overview

This section provides an overview of the process you'll follow to connect your distributed generation over 1MW to our electricity network. A flow chart illustrating this process is on the next page.

A more detailed explanation of each step is provided further in this guide.

### Your initial inquiry

The first step is to assess whether there's existing capacity on our high-voltage network to safely accept your generated power, or whether development or reinforcement on our network will likely be required.

You can do this by visiting our distributed generation hosting capacity map on our website here:

<https://experience.arcgis.com/experience/2f2d3bf248b3486183d59ace9fdc13e3+>

If you'd like to proceed with your inquiry, you'll then complete our initial application forms, providing technical information about your project so we can assess how it can be accommodated on our network.

### Assessing impact

After reviewing your initial application we'll provide you with a high-level review confirming whether there's capacity to host your generation, or whether development on our network or Transpower's national grid will be required.

The high-level review will help you to assess whether you want to proceed with your application by commissioning an impact assessment.

An impact assessment provides a detailed look at the technical aspects of how your generated load will impact our network. It helps us to determine that security of supply and reliability on our network can be maintained once your generation is connected.

### Delivery pathways

Based on the how much you'll be generating, the setup of our existing network, and the outcome of your impact assessment, we'll assign the delivery pathway that's right for you.

#### Standard connection

If you'll be connecting to our 11kV network, and standard switchgear and protection systems will be able to be used, we'll design the connection and then you'll work independently with a Powerco-approved contractor to price and build it.

#### Powerco-managed connection

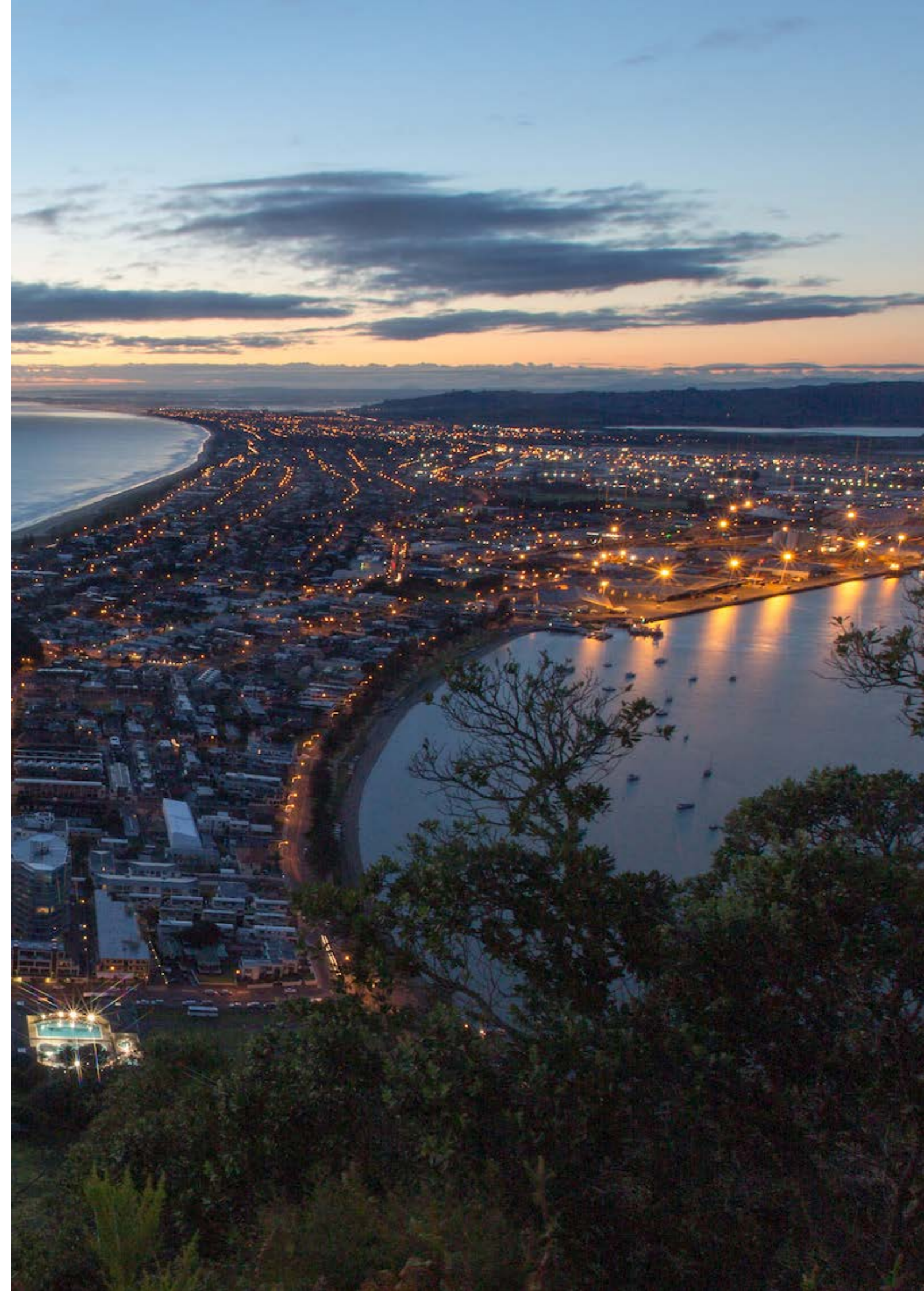
If your project involves a straightforward connection to our 33kV network, or your generation will need special protection or other development on our 11kV network, your connection process will be allocated to a Powerco Project Manager and Powerco will design, price and manage the build of the connection on your behalf.

#### Major Powerco-managed connection

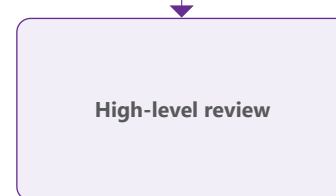
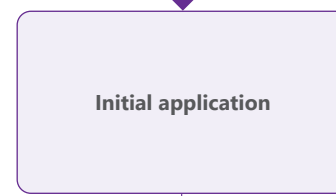
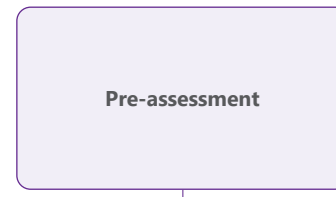
If you'll be connecting to our sub-transmission network (which connects our network to the Transpower national grid), requiring a new switching station to be built, your connection process will be managed by our team, in collaboration with Transpower if required.

#### Commissioning and operations

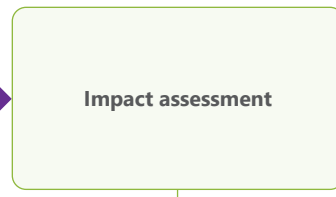
Once the construction of your network connection is complete, it will go through a process of testing before it's lived and becomes operational.



**Your initial inquiry**



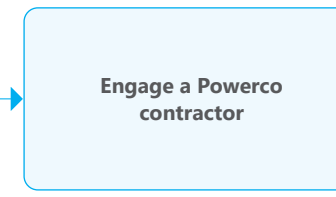
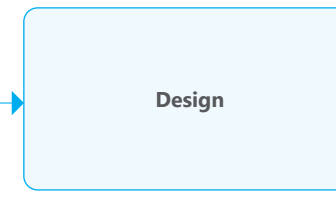
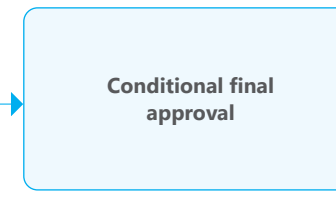
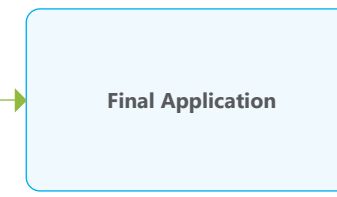
**Assessing impacts**



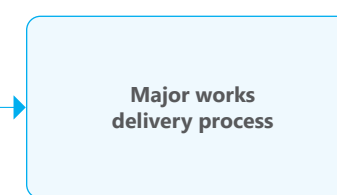
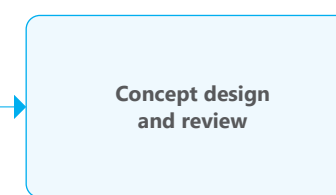
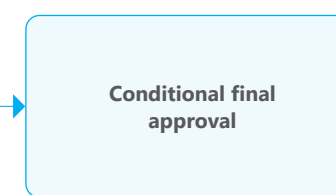
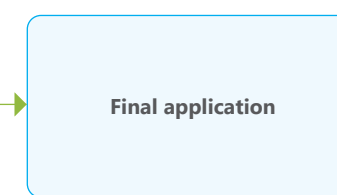
*Depending on the outcome of your impact assessment your project will go into one of three delivery pathways.*

**Delivery pathways**

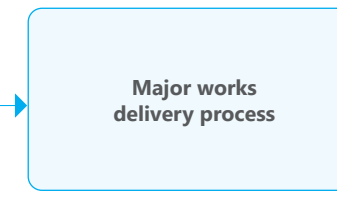
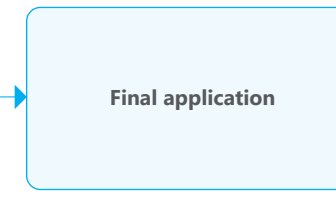
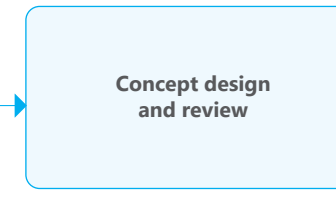
Standard connection



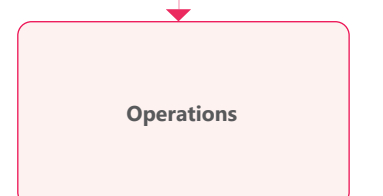
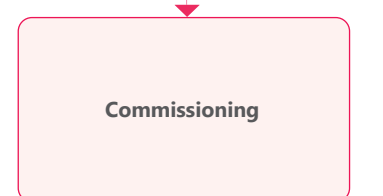
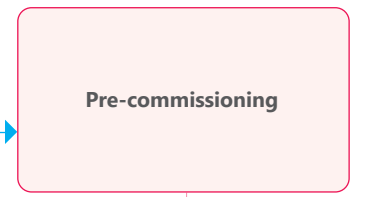
Powerco-managed connection



Major Powerco-managed connection



**Commissioning and operations**



## Customer-initiated network development explained

As an electricity distribution business we own and operate the network of substations, overhead lines, underground cables, transformers and other assets that run between Transpower's Grid Exit Points and customers' boundaries.

When a distributed generator wishes to connect to our network we work with them to; ensure that our assets are available to the site boundary to connect with, and, that we have the network capacity, protection scheme and other operational requirements to safely accommodate the generated load being fed back into the network, while maintaining network performance for other connected customers.

That means design and development on Powerco's electricity network will be required if;

- New high-voltage (11kV or 33kV) overhead lines or underground cable need to be built in order to reach your site.
- The amount of electricity generated by your project will exceed the voltage capacity of our existing lines or cables when added to the current already running through them. In this scenario, the conductor (lines or cables) would need to be upgraded to allow for the additional voltage.
- Upgrade of Powerco's substation equipment is required (for instance circuit breakers, switching stations, protection and communication control systems).

### Working with Transpower

We have obligations to maintain power quality and voltage range in line with benchmarks we have in place with Transpower (the national grid owner).

We'll make an application into Transpower's connection management process for your distributed generation connection if your impact assessment shows that:

- Your connection will require any new or upgraded Transpower assets, such as a transformer or a special protection scheme, and/or
- Your generation will cause any thermal, harmonic, dynamic or voltage issues that can't be managed within our existing operating limits and allocations (we must maintain required performance obligations at the national grid connection point).

You'll be responsible for the cost of the application.

For an overview of the Transpower connection management framework, and timeframes associated with grid work, visit:

<https://www.transpower.co.nz/connect-grid/our-connection-process>

You'll also need to work with Transpower in their role as the system operator of the national grid to make sure that your distributed generation will meet their standards. You can contact Transpower to understand their requirements at [system.operator@transpower.co.nz](mailto:system.operator@transpower.co.nz)

### Fees, your capital contribution and other costs

There's a cost of \$5,000 to process your initial application.

You'll also be responsible for the costs associated with the impact assessment and design of your network connection.

If development on our network is required, Part 6 of the Electricity Authority's Electricity Industry Participation Code specifies that the generator pays for the connection to be built. We may make a contribution to the connection costs if the network development carried out to connect you will also benefit other customers over the long-term.



Tō pakirehua tuatahi

## Your initial inquiry

Your initial inquiry consists of doing your own pre-assessment before completing our initial application forms.

### Pre-assessment

Your first step is to check where our high-voltage network is located in relation to your site, and whether there is existing capacity to safely accept your generated power.

You can do this by visiting the utility-scale distributed generation hosting capacity map on our website here: [Click here](#)

The map provides the location and estimated hosting capacity of our 11kV, 33kV and 110kV lines and cables as well as the estimated maximum amount of distributed generation any section of the network can accommodate. It serves as an initial indication of whether your project can be connected, or whether network development to increase hosting capacity and/or build new network assets to reach your site may be required.

Please note: the map provides an *estimate* of hosting capacity only.

### Initial application

We will provide you with your high-level review within 30 business days following the submission of your initial application.

If you'd like to start the connection application process with us, we recommend engaging an electrical engineering consultant to assist you in completing your initial application. Your consultant will be able to help provide the technical information required in our forms.

Your initial application consists of two forms:

- Our preliminary information request form.
- Our initial application form.

These are available on our website here:

<https://www.powerco.co.nz/get-connected/utility-scale-generation>

If you have any questions for us before you decide whether to start the initial application process, you can email us at [energy.solutions@powerco.co.nz](mailto:energy.solutions@powerco.co.nz)

Completed initial application forms should be emailed to: [energy.solutions@powerco.co.nz](mailto:energy.solutions@powerco.co.nz)

### High-level review

Once you have submitted your initial application to us we will review it and provide you with a high-level review. This review will give you an indication of technical feasibility and a high-level estimate for connecting your generation to our distribution network.

Your high-level review will contain information on:

- Whether our network can accommodate your generated load.
- High-level scope of network development required to connect you (if any).
- An estimate of network development costs.
- Requirements for your impact assessment studies.
- Details about next steps.

Based on the information we provide you in our high-level review you'll have an understanding of our network capacity to connect you, and/or the development that may be required to accommodate your generation.

### This section at a glance:

- Check our utility-scale distributed generation-hosting capacity map.
- Engage an electrical engineering consultant.
- Complete our two initial application forms.

### Key information



Preliminary information request form.  
Initial application form.



\$5,000 fee to review your application.



You'll receive a response to your initial application within 30 business days.



[www.powerco.co.nz/get-connected/utility-scale-generation](http://www.powerco.co.nz/get-connected/utility-scale-generation) to access our map and application forms.



If you'd like to proceed further with the connection process based on our high-level review you'll then engage an electrical engineer to undertake impact assessment studies for you.

## Impact assessment

Your next step will be to commission any impact assessment studies we've requested. These will look at the implications of connecting your generation on the performance and safety of our network, and demonstrate how our performance requirements will be met.

You'll need to engage a suitably qualified and experienced electricity engineer to undertake these for you and provide it through to us for review.

Depending on the information we need, the impact assessment/s will cover things like:

- System modelling showing the anticipated performance of the network once your generation is connected.
- Protection philosophy.
- That Transpower requirements can be met (if required).
- Power quality and harmonic requirements are demonstrated and mitigated where needed.

Powerco's performance requirements are documented in the Distributed generation 1MW and over Connection Standard to provide guidance on the information we'll need from you.

Before we review your impact assessment studies you'll enter an Advanced Works Agreement with us agreeing to cover our review costs of \$10,000.

It will then be reviewed by our network planning, substation design, protection design and power quality teams.

The review of your impact assessment studies will take between 5 – 10 weeks depending on the size and complexity of your project.

In most cases your impact assessment/s will go through several rounds of feedback and iteration between our team and your electricity engineer before being finalised.

The impact assessment will also allow us to determine which delivery pathway your connection will proceed through.

## This section at a glance:

- We'll provide you with a high-level review outlining our network capacity to connect you, and any development required to accommodate your generation.
- We'll provide requirements for the impact assessment studies you'll need to complete to demonstrate how your generation can be connected to our network and meet our performance requirements, and we'll support your electricity engineer to undertake them. Power quality and harmonic requirements are demonstrated and mitigated where needed
- You'll enter an agreement with us to cover our costs to review your impact assessment/s.
- We'll review your impact assessment/s and confirm your delivery pathway.

### Key information



Advanced Works Agreement.



You'll be responsible for the costs associated with carrying out the impact assessment/s, and our review of them.



The review of your impact assessment/s will take 5-10 weeks, depending on its complexity.



## Delivery pathways explained

Once we've reviewed your impact assessment we'll confirm which of our three delivery pathways your project is suited to.

Our delivery pathways enable us to work with you to connect your generation using a process appropriate to the scale and complexity of your project.

The delivery pathways are:

### Standard connection

The standard connection pathway will apply if you'll be generating less than 5MW, will be connecting to our 11kV network, and only require standard switchgear and protection systems. We will undertake the design of your connection and you'll then be able to work independently with a Powerco-approved contractor to quote and build your connection to our network.

Refer to page 21 for more detail.

### Powerco-managed connection

The Powerco-managed connection pathway will apply if your project involves a straightforward connection to our 33kV network, or your generation will need special protection or other development on our 11kV network. Your connection process will be managed by our team on your behalf.

Refer to page 23 for more detail.

### Major Powerco-managed connection

The major Powerco-managed connection pathway will apply if you'll be connecting to our sub-transmission network (which connects our network to the Transpower national grid), which will require a new switching station to be built. Your connection process will be managed by our team, in collaboration with Transpower if required.

Refer to page 25 for more detail.

A detailed explanation of the criteria and process for each pathway is outlined further in this section.

## Final application and conditional final approval

Regardless of your delivery pathway, you'll need to submit a final application to connect to our network. In it you'll provide the finalised technical information we need to authorise the build of your connection to our network.

To avoid having your final application declined, you'll need to ensure the following before you complete and submit it to us:

- Our final application form has been used, and it has been filled out correctly.
- Your impact assessment has been submitted and approved, and any issues raised by it have been resolved.
- Transpower input (if required) has been sought by us, and an application made if needed.
- All payments have been made including your initial application fee, and impact assessment review costs.

We will review your final application within 80 business days (unless extended in agreement with both parties) and then we will issue either;

- a conditional final approval letter outlining relevant conditions and/or technical requirements that must be met and/or performed in the build of your connection.
- a letter declining your final application and providing the reasons.

There are no costs associated with the review of your final application.

Some examples of the conditions associated with final approval include:

- Transpower system operator obligations, including additional studies to support system integration, and meeting costs associated with studies and transmission costs required by Transpower the national grid owner.
- Network upgrade requirements – works on the Powerco network that will need to be undertaken to support your generation hosting capacity.
- Metering, connection and installation control point (ICP) requirements.
- Detailed design – studies that determine or demonstrate protection and coordination settings, generation fault ride-through capability and control scheme stability.

- Project readiness and progress – requirement that you provide us with progress reporting, any documentation we need, and pre-commissioning planning.
- Operational requirements – specifics relating to your generation connecting and exporting electricity onto our network, and any operational limitations and/or coordination required between us and you.

Once you have conditional final approval from us you'll have 18 months to meet the conditions of approval.

Outside this timeframe your conditional final approval may expire unless otherwise agreed with us. The 18-month timeframe is set down by Part 6 of the Code, and helps ensure we can continue to equitably provide capacity on our network to customers wishing to connect to us.

We'll let you know when to complete the form which is available via our Distributed generation over 10kW connection standard document: [Click here](#)

This section explains our three delivery pathways in more detail.

## Standard connection

The standard connection delivery pathway applies to simple connections to our 11kV network that don't require development (such as increasing capacity on our network to accommodate your generated load).

We will design (or engage an electrical engineer of our choosing to design) your connection to ensure it meets our technical requirements.

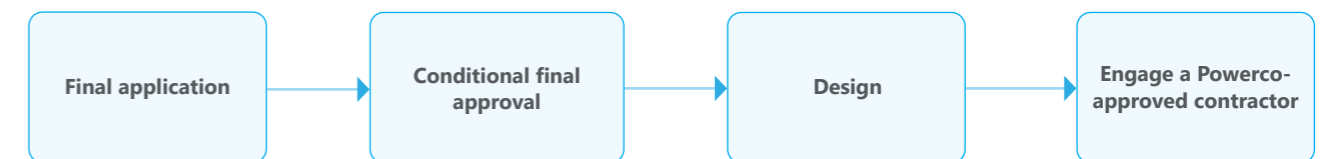
You'll then be able to engage a Powerco-approved contractor to price and build your connection to our network.

### The criteria

If your project meets the following criteria, you'll connect to our network using our standard connection delivery pathway:

- You'll be generating 5MW or less.
- You'll be connecting to our 11kV network.
- N-1 security can be maintained.
- A short circuit ratio of five or more (to ensure we have acceptable stability).
- There are no major civil or building works required to build your 11kV connection point.
- No network development or upgrade work is required upstream.
- Our power quality requirements can be met.
- Our standard protection schemes can be applied.
- There are no easement or consenting issues.

### The process



### The process explained

#### Final application

Once we've confirmed that your project meets our standard connection criteria following the review of your impact assessment, you can submit a final application.

#### Conditional final approval

We'll review your final application and either provide conditional final approval to connect your generation to our network, or decline your application and provide a rationale.

(See page 19 for more information on final application and conditional final approval).

## Design

Once your Advance Works Agreement is signed we'll assign a Project Manager to your project and they will oversee the design of your connection to our network. This ensures that your connection is designed efficiently and meets our technical standards.

Your connection will be designed either by a member of our team, or by an electrical engineer consultant that we select.

## Engage a Powerco-approved contractor

Once your design is ready, you'll engage a Powerco-approved contractor to price and build your connection to our 11kV network.

There are a range of Powerco-approved contractors across our network footprint who are qualified to build connections to our network and we recommend you get quotes from more than one contractor to ensure you get the best price.

Your contractor will work directly with us on the build of the network connection and liaise with us to live in your generation.

The list of Powerco-approved contractors is available on our website here: [powerco.co.nz/approved-contractors](http://powerco.co.nz/approved-contractors).

## Commissioning and operations

See page 31 for details on the commissioning and operation of your connection.

## Powerco-managed connection

If your project will require us to carry out development on our network to either reach your site, or increase capacity to accommodate your generated load, we will manage the design and build on your behalf using the Powerco-managed connection delivery pathway.

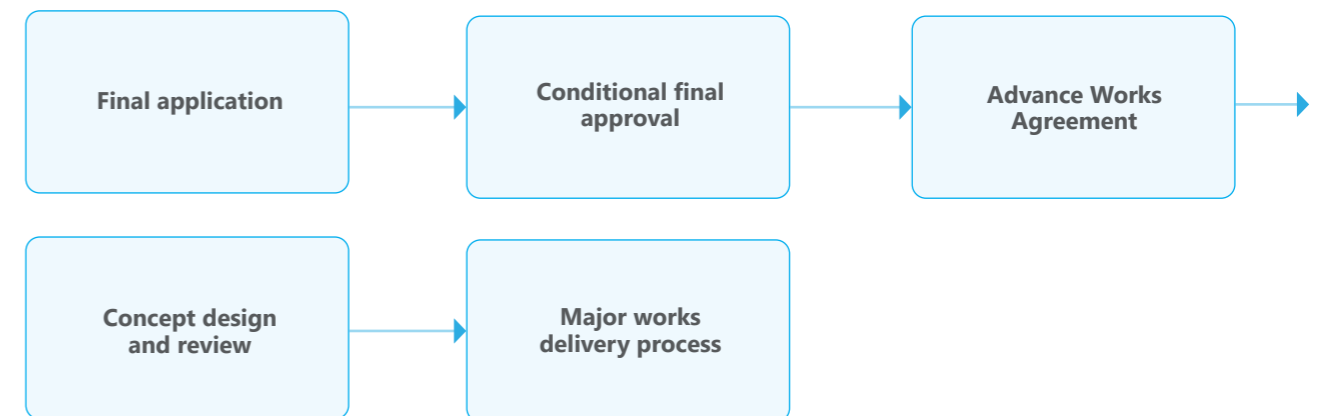
If you'll be connecting to our sub-transmission network (the part of our network that connects us to the national grid), you'll go into the Major Powerco-managed connection delivery pathway (see page 25).

### The criteria

If your project meets all of the following criteria, you'll connect to our network using our Powerco-managed connection delivery pathway:

- You'll be generating 10MW or less.
- A short circuit ratio of 5 or more.
- Our Property Team have assessed any easement or consenting requirements as achievable.
- Your impact assessment has confirmed that your generation will meet our system performance requirements.
- If you're connecting to our 33kV network, no development is required beyond connecting circuit breakers.
- Your 11kV connection is non-standard (ie. requiring non-standard protection, a new substation, new substation circuit breakers or other network development).

### The process



### The process explained

Because your connection will require development on our network, we will manage the design and construction on your behalf. This ensures the connection will meet our technical standards.

Once we've confirmed that your project meets our Powerco-managed connection criteria, you'll go through the delivery process as follows:

#### Final application

Once we've confirmed that your project meets our Powerco managed connection criteria following the review of your impact assessment, you can submit a final application.

### Conditional final approval

We'll review your final application and either provide conditional final approval to connect your generation to our network, or decline your application and provide a rationale.

(See page 19 for more information on final application and conditional final approval).

### Advance Works Agreement

Because we'll be managing the design and build of your connection to our network, you'll sign an Advance Works Agreement with us. The Agreement sets out the work we will undertake on your behalf that you agree to pay for prior to us commissioning the concept design and review work.

### Concept design and review

Once the Advance Works Agreement is in place we'll commission an electrical engineer to produce a concept design for your connection.

The concept design will include:

- The design options for the connection and preferred option.
- Build estimate and high-level schedule.
- Major equipment purchase details.
- Risk register.
- Site investigations (geotech, ecological, flood risk, archaeological, contaminated soil) if required.
- Can include easement and property consent requirements (if required).

We'll then review the concept design internally with our distributed generation, network planning, protection design, power quality, property and consents and quality engineering teams.

During this review period we'll discuss the connection options with you and confirm the best option.

### Major works delivery process

Once the concept design has been finalised, the connection will be ready for the build phase and will go through our major works delivery process, per the concept design.

See page 27 for details on our major works delivery process.

### Commissioning and operations

Once your connection is built, it will be ready for commissioning.

See page 31 for details on the commissioning and operation of your connection.

## Major Powerco-managed connection

A major distributed generation connection project will connect to our sub-transmission network (the part of our network that connects to the national grid).

Due to the level of due diligence, planning and construction required for projects of this complexity and scale, these types of projects go through our Major Powerco-managed connection delivery pathway. This ensures your network connection concept design is fully scoped, risks are identified, and costs are estimated prior to the submission of your final application. We also liaise with Transpower on grid performance, and grid augmentation if that is determined to be required.

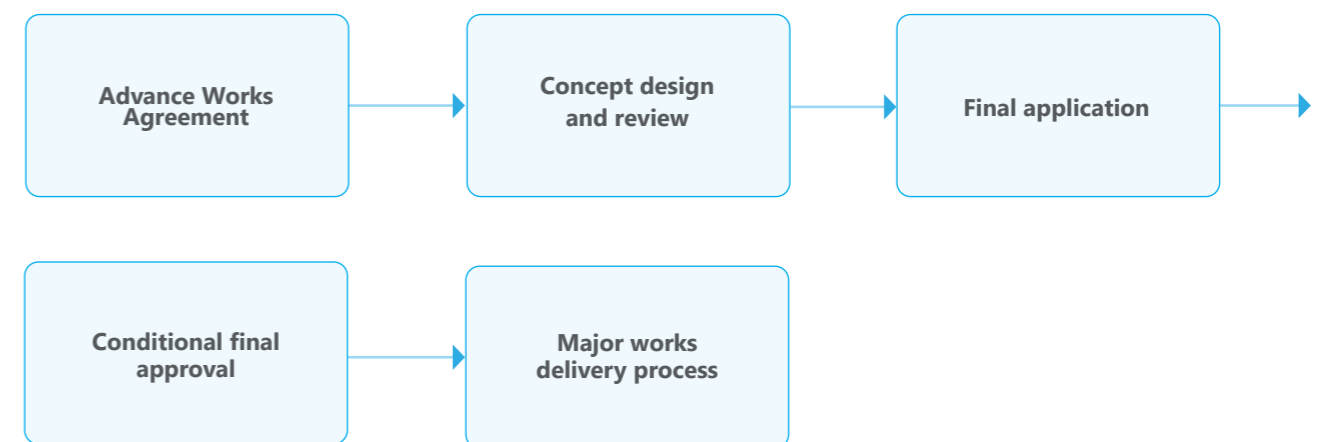
We manage this process on your behalf and once you have conditional final approval to proceed, we also manage the build through our major works delivery process.

### The criteria

If your project meets any of the following criteria, you'll connect to our network using our Major Powerco-managed connection delivery pathway:

- You'll be generating 10MW or more.
- A short circuit ratio less than 5.
- Network development on our sub-transmission network is required.
- Collaboration with Transpower is required.
- Land needs to be purchased and/or easements negotiated with landowners.
- Environmental consents will be required.

### The process



### The process explained

Once we've confirmed that your project meets our Major Powerco-managed connection criteria, you'll go through the delivery process as follows:

#### Advance Works Agreement

Because we'll be managing the design and build of your connection to our network, you'll sign an Advance Works Agreement with us. The Agreement sets out the work we will undertake on your behalf that you agree to pay for prior to us commissioning the concept design and review work.

### Concept design and review

Once the Advance Works Agreement is in place we'll commission an electrical engineer to produce a concept design for your connection.

The concept design will include:

- Options for the connection.
- Scope of works for detailed design.
- Engineers estimate.
- Communications equipment detail.
- Risk register.

Conducting the concept design will take approximately 3-6 months depending on the size and complexity of your project.

We'll then review the concept design internally with our distributed generation, network planning, protection design, power quality, property and consents and quality engineering teams. This process takes three months or more.

We will work directly with the electrical engineer to finalise the concept design if any issues are raised as part of the review process.

### Final application

Once the concept design has been reviewed and finalised you'll complete and submit your final application to us.

### Conditional final approval

We'll review your final application and either provide conditional final approval to connect your generation to our network, or decline your application and provide a rationale.

(See page 19 for more information on final application and conditional final approval).

### Major works delivery process

Once you have conditional final approval, and you intend to proceed with your generation project, the next step will be to enter into an Advance Works Agreement (for detailed design) or Works Agreement (for detailed design and delivery).

Your project will go into our major works delivery process for construction.

See page 27 for details on our major works delivery process.

### Commissioning and operations

Once your connection is built, it will be ready for commissioning.

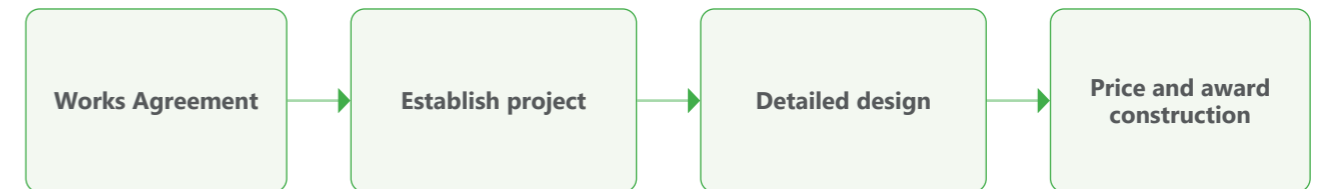
See page 31 for details on the commissioning and operation of your connection.

### Major works delivery process

If you're going through either of the Powerco-managed delivery pathways, we will manage the construction of your connection using our major works delivery process.

This is the same process we use to connect large new customer loads to our electricity network.

Through our major works delivery process, a Powerco project manager will be assigned to oversee the design, tender and construction activities. Build work can take several years, here's an indication of what you can expect:



#### Works Agreement

If you're ready to proceed, you'll sign a Works Agreement with us before we start delivery.

The Works Agreement will detail the scope of work we'll undertake on our network in order to connect your generation and document your agreement to underwrite the build costs in the form of your capital contribution.

The signed Works Agreement will give us the go ahead to proceed and your project/s will be fully handed over to our project management team for delivery.

Terms of the Works Agreement include (not are not limited to):

- Scope, demarcation and ownership of the works.
- Delivery commitments.
- Costs and treatment of cost variation.
- Capital contribution and payment terms.
- Treatment of scope variation.
- Warranties.
- Powerco investment recovery.

#### Establish project

Once the Works Agreement is in place, the work will be handed to a Powerco project manager.

They will establish the project internally to monitor time, cost and scope of the project throughout the construction phase.

Work may be conducted in stages, or the project may be broken down into a series of smaller projects and carried out in a phased way, depending on how much development on our network is required to connect you and whether Transpower involvement is required.

### Detailed design

Your concept design will be the basis for your detailed design. Detailed design provides assurance of the design and how construction will be carried out.

We will do the design, or engage a Powerco-preferred engineering consultancy to do it for us. You are responsible for the costs which will ultimately form part of the project costs, and you'll sign either on Advance Works Agreement or a Works Agreement with us prior to work starting.

Detailed design costs include scoping, pricing, design performance and a post-review. Additional costs relating to property, environmental and geotechnical matters may also be applicable.

The detailed design will include:

- Scope of works and accompanying designs to build.
- Detailed risk register.
- Land access requirements are identified and any required easements are negotiated.
- Indication of your capital contribution (if any).

Your detailed design will take 6 to 14 months to complete depending on the complexity and dependencies of carrying it out.

### Price and award construction

Using the completed detailed design the project manager will engage with our major contractors to tender for the construction work.

Typically it takes between six weeks and three months to price and award a contract.

### Manage construction

The construction company will now start preparation for construction.

They will assign a project manager to liaise with Powerco's project manager throughout the construction phase.

The project managers will work together to ensure that the property and consents team have all necessary consents and easement agreements in place, arrange any planned outages required to conduct work safely, and to manage and mitigate risks.

The Powerco project manager will conduct regular site visits to ensure milestones are being met, and that completed work and materials used are as agreed in the scope of work.

The construction company will arrange access with landowners to build equipment per the easement agreements as required. This may include liaising with you to build assets on your site.

### Your electricity consumption metering

You'll also need to work with a retailer to have four-quadrant metering installed to track your electricity generation volumes.



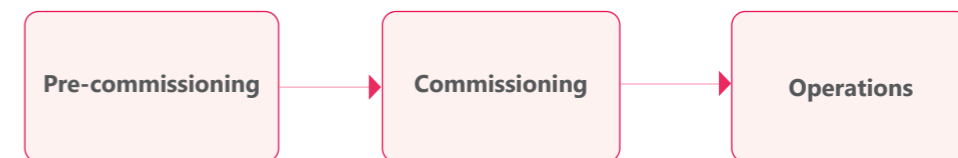
## Ngā tiringa me ngā whakahaere

# Commissioning and operations

Once the construction of your network connection is complete, it will go through a process of testing before the connection is livened and handed over for normal operations.

This process applies to all utility-scale distributed generation projects.

This part of the process relates to testing and commissioning your network connection. You'll be responsible for testing and commissioning your generation.



### The process explained

#### Pre-commissioning

The Powerco-approved contractor carrying out the construction will prepare and submit pre-commissioning testing plans to your Powerco project manager at least eight weeks prior to carrying them out.

The full technical requirements for your pre-commissioning testing are detailed in the following documents.

Your pre-commission testing will be processed via our Network Access Planning Application (NAPA) process and will need to meet the following:

- Our lead-time requirements, which can be found here: Release Planning Standard.
- The pre-commissioning plan must use our template here: Powerco Commissioning Plan Template, and must be provided along with:
- Operational Documentation Requirements for Commissioning.

We may also request that a Powerco representative attends the testing.

You will need to cover the costs associated with testing.

#### Testing and Commissioning

Testing and commissioning will happen in three phases;

1. Offline testing
2. Online-connection testing
3. Post-connection testing

The testing is designed to verify that:

- There are no adverse quality or security of supply effects on our network.
- Your site is compliant with our requirements.
- There's no damage to our assets or impact on other customers connected to the same supply.

Full testing and commissioning information can be found in our Distributed generation 1MW and over connection standard.

#### Operations

Once your generation is connected to our network, your operations it will be subject to:

- The connection terms and conditions of Schedule 6.2 of Part 6 of the Electricity Industry Participation Code.
- The connection terms set out in the Distribution Generation Connection Agreement signed between us.
- Compliance with the technical requirements set out in our Distributed generation 1MW and over connection standard.
- Any technical requirements specified in your final conditional approval.
- Plus, your operating protocol which will be established to detail how your generator must operate, or be operated.

We'll also hand you over to a regional account manager who will be your point of contact with us.

Ngā kōrero tautoko

## Supporting information

### Our agreements explained

#### Advance Works Agreement

Prior to signing a Works Agreement, you may enter into one or more Advance Works Agreements with us. An Advance Works Agreement sets out the terms on which we agree to undertake, and you agree to pay for, any 'advance work' to be undertaken prior to a Works Agreement being signed. Examples of 'advance work' that require an Advance Works Agreement include:

- Concept design review.
- Ordering long lead items (e.g. transformers).
- Carrying out your detailed design of the works.
- Obtaining investigations or reports (e.g. geotechnical) that may be necessary in respect of the work.
- Preparation of resource consent applications for the works.

#### Works Agreement

Before we start network development, we'll agree the scope of work and your capital contribution to our costs and this will be recorded in a Works Agreement. Once the Works Agreement is signed, Powerco will engage a Powerco approved contractor to design and carry out the works.

#### Land Purchase Agreement

In certain circumstances we may need to purchase land from you, for example if your project requires a substation to be built on your land. We use the template Auckland District Law Society (ADLS) Agreement for Sale and Purchase, which sets out details about the land being sold and all the of the terms and conditions of the sale.

#### Connection Agreement

Sometimes we enter into a Connection Agreement directly with our large customers. These agreements detail the terms and conditions on which we allow you to connect to and receive lines services from our network. If we have a Connection Agreement with you, you will be billed directly for our lines charges rather than having them appear on your power bill from your retailer. You'll have a separate agreement with your retailer to pay for the electricity you use.

You can choose to negotiate a Connection Agreement with us once your connection has final conditional approval.

#### Easement Agreement

Sometimes to connect you to our network, electrical equipment needs to go on your land. Examples of equipment that may need to be installed are overhead poles and lines, underground cables, transformers and switchgear. An Easement Agreement gives us the right to put our equipment on your land. The equipment remains our property and we're responsible for maintaining it. An Easement Agreement also gives us the right to access your property when we need to inspect or maintain the equipment. An easement is registered on the land title, so it stays in place even if the land is sold.



## Glossary

### Capacity

The amount of electricity available for customers to use.

### Distributed generation

When customers who generate their own power (solar, wind, liquid fuel) connect to a distribution network.

### Easement

A legal right to use another person's land. We use easements when we're putting equipment (such as poles, overhead lines or transformers) on a customer's land (or their neighbour's land).

### kW

Kilowatt. 1,000 watts.

### Load

The amount of electricity you draw from the network to run your operations.

### Peak load

The highest amount of electricity you use to run your operations – for instance, when all machinery is in use during peak production periods.

### MVA

Megavolt-ampere.

### MW

Megawatt. 1,000 kilowatts.

### N-1 security

N-1 security is uninterrupted electricity supply. N-1 security involves building contingency into an electricity supply solution so that in the event that the primary source of supply is interrupted, supply will come from a second source.

### Powerco-approved contractor

An electrical or gas contractor approved to carry out work on our networks.

### Short circuit ratio (SCR)

SCR is the synchronous three phase fault level (in MVA) divided by the rated output of an inverter-based resource (IBR) generating system (in MW or MVA) measured at the generating system's connection point. SCR is an index to quantify the system strength of the power system or network with IBR.

### System Strength

System strength is a characteristic of an electrical power system that relates to the size of the change in voltage following a fault or disturbance on the power system. The system strength at a given location is proportional to the fault level at that location, inversely proportional to effective grid-following inverter-based resource (IBR) penetration seen at that location.

### Transpower

The state-owned enterprise that owns and maintains the national grid.

## Contact us

To get in touch about the utility scale distributed generation process, email [lsdgmanager@powerco.co.nz](mailto:lsdgmanager@powerco.co.nz)

