

Firstlight **network**TM

Distributed Generation
CONNECTION AND OPERATION

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1. Introduction

1.1 Introduction

The purpose of this document is to provide details of the processes necessary and information required to enable connection of distributed generation to Firstlight Network Limited's assets.

The document contains:

- The nature of distributed generation, and the safety, technical, operational, commercial and regulatory issues or requirements that may be encountered.
- Firstlight Network Limited policies relating to connection and operation of distributed generation.
- Application forms that must be completed as part of the applicant's initial application and, where applicable under the Regulations, final applications to connect distributed generation. It is preferable that applicants make contact with Firstlight Network Limited to discuss intended generation as soon as possible so that issues can be resolved before submitting an initial application.

The connection of distributed generation is regulated by the Electricity Participation (Connection of Distributed Generation) Code 2010. This code specifies a number of matters such as the time period within which Firstlight Network Limited must process the application, the maximum fees that can be charged for processing an application and inspecting the generation, and a series of default terms & conditions.

The participation code provides for the following classifications of generation:

- Generation at a rate of 10kW or less
- Generation at a rate greater than 10kW

The varying requirements and timeframes for the classifications are defined in the participation code.

This document is based on the participation code, and where this document is inconsistent or unclear, the code shall prevail.

1.2 Definitions

Distributed generation	Distributed generation (Also known as embedded generation) is electricity generation equipment that is embedded within a distribution network, and is connected in such a way that it can produce energy flow into the network, or loads connected to the network. Distributed generation is designed to operate in parallel with the electricity network. Distributed generation does not include standby generation that can only operate in isolation and provides energy to loads that are disconnected from the network.
Connection assets	Means assets such as (but not limited to) lines, poles, transformers, cables, fuses, re-closers or circuit breakers necessary to connect generation to our network.
Regulations	Means the Electricity Authority (Electricity Industry Participation Code 2010) or any regulation passed in substitution thereof.
Requirements	Means the requirements referred to in Sections 2.2 to 2.6 of this document.
Firstlight Network Limited	Means Firstlight Network Ltd and includes the associated company Firstgas Group Ltd.
The Generator or the Applicant	Means the party wishing to connect distributed generation to Firstlight Network Limited's network.
Network or Distribution Network	Assets such as (but not limited to) lines, poles, transformers, cables, fuses, re-closers or circuit breakers forming Firstlight Network Limited's electricity distribution and sub-transmission system.

2. Requirements for Distributed Generation

2.1 General Requirements

Distributed generation must comply with the following general requirements:

- The specific requirements contained in the [Electricity Safety Regulations 2011](#) and associated codes of practice.
- The general requirements contained in the [Health and Safety in Employment Act 1992](#).
- [Dam Safety Rules](#) and Ministry of Business innovation & Employment requirements.
- The funding and policy requirements identified in section 3 of this document.
- Requirements contained in the [Electricity Participation Code 2010](#).

2.2 Technical Requirements

Distributed generation must comply with the following technical requirements:

- AS 4777.1 2002
- AS 4777.3 2002
- AS/NZS 3000

For a generator connected through an inverter, the inverter must comply with the following additional requirements:

- AS 4777.2 2002

2.2.1 Inverters

Inverters installed on Firstlight Network Limited's network must be approved by Firstlight Network Limited.

A list of compliant inverters which Firstlight Network Limited accepts can be found on the Australian Clean Energy Council website here: <http://www.solaraccreditation.com.au/products/inverters/approved-inverters.html>.

Inverters not on this list will be dealt with on a case by case basis.

2.3 Operational Requirements

In addition to the general requirements contained in Firstlight Network Limited's Connection Standard, distributed generation must comply with the following operational requirements:

Unless the generation is specifically designed to supply the distribution network, as an isolated network, and has been approved as such by Firstlight Network Limited, the generation installation must include a switch or circuit breaker that disconnects and locks out (requiring a manual action to reset) if the mains voltage varies by more than 3% from the standard operating voltage, or if the mains frequency varies from 50Hz by more than 0.5Hz for more than 2 seconds. This is to ensure that the distribution network is not back-livened from the generation. Back-livening would create a safety hazard for fault staff and can result in un-synchronised closing between the grid and generator causing damage to equipment.

For high voltage distributed generation installations, the generator must employ trained staff and have appropriate systems in place, in order to carry out isolation, earthing, and issuing of assurances, in accordance with the Safety Manual Electricity Industry (SM-EI).

- Under the Electricity Participation Code, the generator may be required to provide asset capability information and comply with the requirements of the System Operator.
- For operational and safety purposes, generation installations may need to provide real time information of Generator Operational State, Connection State and Output Load. In general, Firstlight Network Limited can provide SCADA equipment for connection of Status and Analog indication, or can support modbus/DNP protocols.
- Clear and durable notices must be prominently posted near the point of connection between the generator and the network, stating that there is connected generation. For generation within an

installation containing load, additional notices at the switchboard and meter box are required. This is to warn people of the possibility that the installation could still be live even if the mains have been disconnected.

2.4 Commercial Requirements

The Generator must comply with the following commercial requirements:

- The Generator must have a contract in place with a retailer for the purchase of the energy being generated, or provide evidence that the energy will be consumed within the installation.
- Electricity metering is required, and must be capable of recording all energy flow in the distribution network, both in to and out of the generator installation.
- The energy retailer contracted for purchase of exported energy may charge the generator for metering services and data management.
- Firstlight Network Limited line charges must be included in the contractual arrangements with the retailer.

2.5 Regulatory Requirements

The generation may require one or more of the following classes of consents:

- Resource consent issued by the Regional Council.
- Resource consent issued by the District Council.
- Building consent issued by the District Council.

The generator may also need to liaise with other agencies such as (but not limited to) Land Transport, the Civil Aviation Authority or the Department of Conservation if the generation extends into areas such as road reserve, flight paths or ecologically sensitive areas. Firstlight Network Limited does not provide advice on these matters, or issue such consents.

3. Policies for Embedded Generation

3.1 Open Access Network

Our policy for network access is that any generator who meets the applicable safety, technical, operational and commercial requirements, and who agrees to pay the applicable charges, can connect to our network.

The details of our distributed generation policy are set out in Section 4.6 of the [Firstlight Network Limited 2015 Asset Management Plan](#).

3.2 Financing & Ownership of Connection Assets

Connection of distributed generation to our network may require construction of specific assets, such as a few spans of line, a length of cable or a disconnecter. These assets are referred to as connection assets and can be financed and owned in either of the following ways:

- The generator can install and own these assets at their own cost, subject to Firstlight Network Limited's technical requirements for connection to the network. This will require the generator to assume all usual ownership responsibilities and obligations, such as obtaining planning and building consents, safety, maintenance, fault restoration, land issues and tree trimming.
- Subject to approval by Firstlight Network Limited, the generator can contribute 100% of the capital costs, and Firstlight Network Limited will install and own the assets. In this case Firstlight Network Limited will assume all usual ownership responsibilities and obligations.

3.3 Financing Technical Modifications

The generator may be required to finance technical modifications to the Firstlight Network Limited network, such as re-calibrations of protection or control equipment, which may be necessary once the generation installation is connected to the network.

3.3 Financing Technical Analysis

The generator may be required to arrange and finance technical analysis and modelling necessary to demonstrate that the proposed generation installation can operate without having a negative impact on the distribution network. Firstlight Network Limited will provide information including the line types, line lengths, loading data and protection settings for this purpose.

3.4 Financing Corrective Actions

The generator may be required to finance corrective actions to problems arising in the network, which may be identified once the generation installation is connected to the network. For example, this may include costs for additional power factor correction, or additional control and monitoring equipment required to ensure safe operation of the Firstlight Network Limited network.

3.5 Recognition of Benefits (or Costs) to Firstlight Network Limited

The following may be useful when considering recognition of the benefits (or costs) to Firstlight Network Limited provided by a distributed generation installation:

- The generator contributes toward a solution where the existing network is unable to supply, which contributes positively toward Firstlight Network Limited's security of supply standard.
- The generator contributes to a solution where investment can be deferred. Arrangements put in place will, in general, be linked to penalties when the generator is unable to provide for the agreed contribution. Typically agreements are separated from published tariffs, and are applied to fixed timeframes.
- In recognition of the benefits of distributed generation to the region, the variable component for energy flow from an installation to the distribution network is not charged by Firstlight Network Limited.
- In recognition of the benefits of distributed generation to the region due to the evasion of transmission costs, Firstlight Network Limited may reduce the cost of energy delivery to customers, or defer tariff increases. In general, changes in transmission charges from period to period are reflected by changes in

tariffs. Therefore benefits to Firstlight Network Limited from generators (and users undertaking load management strategies) are averaged across the different capacity groups and users, so generator contribution cannot be recognised directly. In some cases where deferred investment costs or reductions in reinvestment costs can be specifically identified, direct recognition may be considered.

- Reduction of losses is excluded, as the benefits are realised by the energy retailers and are passed on to end users. In addition, due to the varying load conditions typical in the distribution network, the assessment of the physical losses applicable to a single installation is typically complex, and as such Firstlight Network Limited does not financially recognise the reduction of losses.
- Tariffs covering the provision of the line function services provided by Firstlight Network Limited will be charged and amended periodically. Published tariffs are based on active (MW) power capacity requirements for an installation, and averaging is applied across groups within a number of capacity bands.
- Where generation is embedded within an existing connection, the capacity charges for the greater of the net imported or exported demand are applied to the installation.
- Firstlight Network Limited has not historically required tariffs based on reactive (MVar) requirements. It is likely that tariffs of this nature will be developed.

3.5 Limiting the Density of Generation

Firstlight Network Limited's distribution network has been designed to distribute electricity in one direction from large grid substations to remote end users. The following guidelines for distributed generation limits are likely to apply to the current network. Actual limits are determined on a case by case basis. These limits are applicable in considering size and location of generation.

Approximate limits for generation connected to:

- | | |
|--|----------------|
| • Urban Sub-transmission 50kV | -Maximum 15MW |
| • Rural Sub-transmission 50kV | -Maximum 5MW |
| • Rural Sub-transmission 33kV | -Maximum 3MW |
| • Urban Distribution 11kV | -Maximum 4MW |
| • Rural Distribution 11kV near Zone substation | -Maximum 1MW |
| • Remote Rural Distribution 11kV | -Maximum 0.5MW |
| • Generation within a domestic installation | -Maximum 10kW |

Firstlight Network Limited reserves the right to decline any application to connect generation to the network if it is believed that any distributed generation could interfere with the operation of the distribution network (including overloading), or alter the quality of supply provided to any currently connected installation. In the event that more than one application is received to connect generation to part of our network, the participation code allows for Firstlight Network Limited to consider such applications as competing bids for limited capacity.

Firstlight Network Limited currently have two areas where distributed generation will need to be assessed before any new installations are connected.

- Mata Feeder (Congested)
- Matawai Feeder (Congested)

3.6 Operational Functions

Firstlight Network Limited operates a number of standby generators, which supply the distribution network independently from the grid during outages and maintenance activities. In general, to maintain stability of the network, distributed generation will not be permitted to operate in parallel with the standby generators when isolated from the grid.

For planned shutdowns, notifications are sent via the generator's energy retailer, in accordance with the process agreed with the retailers. For larger generation customers, direct consultation and notification will be undertaken whenever possible.

For unplanned events, Firstlight [REDACTED] operate an external service to provide communication relating to the outages. For larger generators, direct communication can be arranged.

The priorities for fault restoration and repair work are determined on the basis of the nature and number of customers affected, the available resources, locations, environmental conditions, and estimated repair times. In general, generation only connections are expected to have a lower priority assigned, compared with load using customers, who have a greater dependence on their electricity supply.

3.7 Ensuring Safety and Stability

It is important that any new distributed generation can operate safely and effectively using the distribution network. In addition, the operation of equipment within an installation must not cause interference or hazards to other installations. The impacts are assessed in terms of the following categories:

Effect on Fault levels

Distributed generation can increase the design fault levels of the distribution network, affecting the ability for existing protection systems to operate correctly. The increased fault levels may also exceed the fault rating of cables, conductor and equipment.

Frequency Performance

Because the distribution network stability is affected by frequency, the size, type and location of generation is assessed to establish the ability of the generation to influence other generators, and the ability of the generators to disconnect or remain operating when the grid or mains frequency disappears. Remote signalling and control functions may be required to ensure safe operation of the distribution network.

Voltage Control

In general, rural connected generators are expected to cause increased voltage, where the size of the generator is greater than the minimum load conditions of the connected segment. It may be necessary for generators to adjust output power levels to maintain voltage levels at existing customer installations to levels required by the participation code. Voltage flicker or momentary changes in voltage caused by step changes in output, or excitation inrush on induction generators, must be maintained within the guidelines identified by the Committee Report on Motor Starting currents.

Power Factor Correction

To maintain the network efficiency and maximise stability, all embedded generation installations must maintain a power factor between 0.95 lag and unity. Load Control signals levels can be influenced by power factor correction. Where operation of distributed generation affects the correct operation of load control equipment, the generator is required to finance and/or carry out corrective actions.

Harmonic Levels

Distributed generation can introduce harmonic levels that are not typically present in the distribution network. In general, the ability to determine adverse impacts on harmonic levels cannot be established prior to connection of distributed generation. Where harmonic levels impact on power quality and adversely affect other equipment connected to the network the generator must alter operating patterns or make the necessary alterations to eliminate any interference.

Security of Supply

Where generation is capable of outputs greater than or equal to the load of a segment of the distribution network, and is approved by Firstlight Network Limited to operate in isolation from the grid, analysis of the synchronising arrangements and remote signalling requirements may be necessary to ensure safe operation of the distribution network.

Compatibility with Other Generation

Proposed generation in a related or adjacent network segment may react with other established generation. In general, the ability to determine adverse interaction between generators cannot be established prior to operation of generators. Generators may be required to disconnect or adjust output levels for periods where adverse interaction with previously established generators is found to occur.

3.8 Change of Occupancy or Ownership

It is important that any new owner or occupant of a premise involving distributed generation is aware of the safety, technical, operational and commercial aspects. Accordingly, Firstlight Network Limited must be notified of any new occupant or owner so arrangements can be made to discuss the obligations of the new owner or occupant.

3.9 Confidentiality of the Application

The participation code allows for the broad details (but not necessarily the ownership details) of generation applications to be made available to other applicants, or existing generators whose generation might be affected by the proposed generation.

4. Connection Process for Distributed Generation Greater than 10kW Capacity

4.1 Step 1 (Initial Application)

To begin the connection process the applicant must provide Firstlight Network Limited with a completed 'Application form' and 'Technical Form'. It would be preferable for the applicant to contact Firstlight Network Limited to discuss the generation proposal first.

The Application form and Technical form is provided at the end of this document, defining all information required. Both these forms must be completed for applications above 10kW. Additional pages including drawings, maps, photos and descriptive text must be clearly marked with a reference, and the reference identified in the relevant section on the forms. These two forms request important information to enable Firstlight Network Limited to assess the proposed generation in terms of the relevant requirements and policies.

Component and asset identification information is required to update operational records and systems, to ensure clear communication in all operational matters. The line/cable information is required to maintain records associated with information disclosure requirements.

The technical data and performance related information is necessary to enable Firstlight Network Limited to analyse the impacts of the distributed generation on the distribution network components, and assess the effects on other customers connected to the distribution network, as per the requirements and policies detailed in Sections 2 and 3 of this document.

The energy profile information is necessary to enable assessment of the generation to affect the network, as detailed in Section 3.7 and the possible contribution to any benefits. This information will typically include; half hourly, weekday and weekend daily profiles, monthly or seasonal trends, and a long range annual forecast. The basis for projections should also be described, with reference to any testing or monitoring work undertaken or assumptions made to arrive at the profiles. The daily and weekly profile information is also used to assess the effects on other customers connected to the distribution network.

Technical Information Required:

- Type of generation to be connected (hydro, wind etc).
- Manufacturers' rating of the generator, or if this is not possible, a certification of its maximum rating.
- The configuration of the proposed generation installation, in particular whether the generator is a new generator or an addition to an existing generator. If the proposed generator is an addition, the rating of the entire installation at the single point of connection to the network must be specified.
- The technical specifications of the generator and associated equipment including maximum real power, reactive power requirements, resistance and reactance, fault level contribution, means of voltage and frequency control, synchronisation and expected operating modes.
- The technical specifications of the equipment that will disconnect the generator from the network in the event that mains voltage is lost.
- Exactly where the generator is expected to be installed.
- Whether the generator is single phase or 3-phase.
- The proposed point of connection to the network (exact location).
- Evidence that the generation installation will meet the requirements set out in Section 2 of this document.

The completed Form 1 will need to be accompanied by the required application fee plus GST (refer Section 6), payable to Firstgas Group Ltd.

If the completed forms (Application & Technical form) do not provide sufficient information for Firstlight Network Limited to determine if the proposed generator meets the standards set out in Sections 2.2 to 2.5 of this document, further information may be requested.

4.2 Step 2 (Response to Initial Application)

After submitting an initial application, the applicant will be advised within 5 working days whether the initial application is complete. If the initial application is incomplete, the applicant will be advised as to the information that will need to be included when reapplying.

Within 30 days of receiving a correctly completed initial application the participations code requires Firstlight Network Limited to provide the applicant with the following information:

- (a) Information about the capacity of the distribution network, including both the design capacity (including fault levels) and actual operating levels.
- (b) Information about the extent to which connection and operation of the distributed generation may result in a breach of the relevant standards for safety, voltage, power quality, and reliability of supply to our connected customers and other generators.
- (c) Information about any measures or conditions (including modifications to the design and operation of the distribution network or to the operation of the distributed generation) that may be necessary to address the matters referred to in points (a) and (b) above.
- (d) The approximate costs of any network-related measures or conditions identified under point (c) above and an estimate of time constraints or restrictions that may delay the connecting of the distributed generation.
- (e) Information about any further detailed investigative studies that Firstlight Network Limited reasonably considers are necessary to identify any potential adverse effects on our network resulting from the proposed connection, together with an indication of...
 - Whether Firstlight Network Limited agrees to the generator, or a suitably qualified agent of the generator, undertaking those studies; or
 - If not, whether Firstlight Network Limited could undertake those studies and, if so, the reasonable estimated cost of the studies that the generator would be charged.
- (f) Information about any obligations to other parties that may be imposed on Firstlight Network Limited and that could affect the distributed generation (for example, obligations to Transpower, in respect of other networks, or under the rules).
- (g) Any additional information or documents that Firstlight Network Limited may consider would assist the generator's application.
- (h) Information about the extent to which planned and unplanned outages may adversely affect the operation of the distributed generation.

The applicant may also make written requests for information such as single line diagrams, equipment ratings, normal switch configurations (including fault levels), and protection system details relevant to the proposed point of connection. The participation code requires such information to be provided within 10 days of receiving a written request.

If either involved party becomes aware of new information that is relevant to the application, that party must make reasonable endeavours to pass the information to the other party.

4.3 Step 3 (Final Application)

Final application to connect the generation installation may be made at any time within 12 months of receiving the information set out in Section 4.2 above. The application must include the correctly completed 'Final Application Form' (at the end of this document) and copies of any technical studies that may have been requested.

Once the correctly completed final application is received, the participation code requires Firstlight Network Limited to make reasonable endeavours to notify in writing:

- Everyone who has made an initial application to connect generation to a part of our network that could be affected by the proposed generation.
- All generators connected to that part of the Firstlight Network Limited network on the regulated terms and conditions that could be affected by the proposed generation.

If a final application from another generator is received within 10 days of receiving the applicant's final application, Firstlight Network Limited may consider the two final applications as competing bids for limited connection capacity, as long as the overriding principles of the participation code are kept in mind. Otherwise, final applications will be treated on a "first come, first served" basis.

Upon receiving the applicant's correctly completed final application that includes evidence that the proposed generation will meet all safety requirements, all statutory requirements, technical and operating requirements, Firstlight Network Limited have:

- 45 business days if the generation capacity is less than 1MW
- 60 business days if the generation capacity is greater than 1MW but less than 5MW
- 80 business days if the generation capacity is greater than 5MW

to do one of the following three things:

- Provide written notification that the final application has been approved with no additional conditions.
- Provide written notification that the final application has been approved but with additional conditions. In such a case, Firstlight Network Limited must provide the conditions in detail, state why such conditions are necessary, specify any charges payable by the applicant, and advise the applicant of how to challenge the decision under the dispute resolution process set out in Schedule 3 of the participation code.
- Provide written notification that the final application has been declined. In such a case, Firstlight Network Limited must inform the applicant why the final application has been declined, how to re-apply, and how to challenge the decision under the dispute resolution process set out in Schedule 3 of the participation code.

Firstlight Network Limited may also request an extension of up to 40 working days to process the final application, which cannot be reasonably refused.

4.4 Step 4 (Notice to Proceed)

If the application to connect generation is approved, the applicant must inform Firstlight Network Limited in writing whether it is intended to connect the generation. The applicant has 30 working days to do so, although this period may be extended at the discretion of Firstlight Network Limited. This written notice of intention to proceed must include the details of the generation, and confirm the acceptance of any conditions that may have been imposed on the connection. If the applicant does not accept any conditions that may have been imposed, but wishes to continue with connection, they must notify Firstlight Network Limited of this dispute within the 30 day period. If such written notice is not provided, the obligations of Firstlight Network Limited under the participation code cease. However, a new application may be made.

4.5 Step 5 (Negotiate connection contract)

Once Firstlight Network Limited has been notified in writing of the intention to connect the generation to the network, a connection contract must be mutually negotiated within 30 working days (starting from the date at which we receive the written notice of intention to connect). This period can be extended by mutual agreement.

If mutually acceptable connection terms and conditions cannot be mutually negotiated, the regulated terms (Appendix A) and conditions set out in Schedule 6.2 of the participation code will apply.

4.6 Step 6 (Connection of the generation)

Before connection to the network, testing of the generator installation must be performed. The applicant must provide Firstlight Network Limited with sufficient notice of these tests to allow Firstlight Network Limited to send qualified personnel to observe the testing and inspection. The applicant must also pay the fee specified in Schedule 6 for Firstlight Network Limited to witness the testing, plus GST.

Following testing and inspection, Firstlight Network Limited must be provided with a comprehensive test and inspection report, including confirmation that any metering will fulfil its intended purposes.

5. Connection Process for Distributed Generation Less than 10kW Capacity

5.1 Step 1 (Initial Application)

To begin the connection process the applicant must provide Firstlight Network Limited with a completed application form.

The application form is provided at the end of this document, defining all information required. Only a completed 'Application Form' is required for applications below 10kW. Additional pages including drawings, maps, photos and descriptive text must be clearly marked with a reference, and the reference identified in the relevant section on the form. The 'Application Form' requests important information to enable Firstlight Network Limited to assess the proposed generation in terms of the relevant requirements and policies.

Component and asset identification information is required to update operational records and systems, to ensure clear communication in all operational matters. The line/cable information is required to maintain records associated with information disclosure requirements.

The technical data and performance related information is necessary to enable Firstlight Network Limited to analyse the impacts of the distributed generation on the distribution network components, and assess the effects on other customers connected to the distribution network, as per the requirements and policies detailed in Sections 2 and 3 of this document.

Technical Information Required:

- Type of generation to be connected (hydro, wind etc).
- Manufacturers' rating of the generator, or if this is not possible, a certification of its maximum rating.
- The configuration of the proposed generation installation, in particular whether the generator is a new generator or an addition to an existing generator. If the proposed generator is an addition, the rating of the entire installation at the single point of connection to the network must be specified.
- The technical specifications of the generator and associated equipment including maximum real power, reactive power requirements, resistance and reactance, fault level contribution, means of voltage and frequency control, synchronisation and expected operating modes.
- The technical specifications of the equipment that will disconnect the generator from the network in the event that mains voltage is lost.
- Exactly where the generator is expected to be installed.
- Whether the generator is single phase or 3-phase.
- The proposed point of connection to the network (exact location).
- Evidence that the generation installation will meet the requirements set out in Section 2 of this document.

The completed 'Application Form' will need to be accompanied by the required application fee plus GST (refer Section 6), payable to Firstgas Group Ltd.

If the completed 'Application Form' does not provide sufficient information for Firstlight Network Limited to determine if the proposed generator meets the standards set out in Sections 2.2 to 2.5 of this document, further information may be requested.

5.2 Step 2 (Response to Initial Application)

After submitting an initial application, the applicant will be advised within 5 working days whether the initial application is complete. If the initial application is incomplete, the applicant will be advised as to the information that will need to be included when reapplying.

Within 10 days of receiving a correctly completed initial application the participation code requires Firstlight Network Limited to give written notice of whether the application is approved or declined. Firstlight Network

Limited may also request an extension of up to 20 working days to process the final application, which cannot be reasonably refused.

If either involved party becomes aware of new information that is relevant to the application, that party must make reasonable endeavours to pass the information to the other party.

5.3 Step 3 (Negotiate connection contract)

Generally applications below 10kW are connected under the regulated terms and conditions.

5.4 Step 4 (Connection of the generation)

Before connection to the network, testing of the generator installation must be performed.

Following testing and inspection, Firstlight Network Limited must be provided with a copy of the electrical certificate of compliance and a Record of Inspection, signed respectively by a qualified electrician and inspector.

6. Schedule of Fees

Schedule 5 of the Electricity Participation (Connection of Distributed Generation) Code 2010

In this schedule, reference to a kW or MW rate, in relation to distributed generation, is a reference to the kW or MW rate at which distributed generation is capable of generating electricity.

A distributor will be required to pay fees for any of the following activities prescribed under the participation code:

Fee for application for distributed generation 10kW or less in total	\$
Distributed generation of 10kW or less in total (Part 1A)	100
Distributed generation of 10kW or less in total	200
Fee for initial application for distributed generation above 10kW	
Distributed generation of above 10kW in total but less than 100kW in total	500
Distributed generation of above 100kW in total but less than 1MW in total	1,000
Distributed generation of 1MW and above	5,000

Distributed Generation Application Form



Note: This is **not** an application for electricity. Allow five working days (from receipt of the completed form by Firstlight Network) for processing for a standard application. Applications are valid for a period of six months from the date of approval.

	AFS Reference
	File Reference

172 Carnarvon Street
 PO Box 1048
 Gisborne 4040
 Tel 06 869 0700
 Fax 06 867 8563
 info@firstlightnetwork.co.nz
firstlightnetwork.co.nz

SERVICE OWNER TO COMPLETE THIS SECTION

Connection Details

Surname			
First name/s			
Business name			
Phone Home			
Phone Work			
House No		Rapid No	
Address			
Suburb			
City/Town			
Post-code			
Energy Retailer			
Date required	/	/	

Billing Details

Please fill in this section if the address where correspondence or accounts are to be sent is different to the Applicant's connection details.

House No		Rapid No	
Street name			
Suburb			
PO Box			
City/Town			
Post-code			

Supplier Details

Contact name	
Company	
Phone Work	

Tariff definitions and connection of supply are available on Firstlight Network's website; <http://www.firstlightnetwork.co.nz/tell-me-about/firstlight-network/regulatory-information/> and follow the links > Line Charges.

I accept and agree to the terms and conditions of connection described in Firstlight Network's Connection Standards.

Applicant signature		Date	/	/	
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Please refer **all enquiries** regarding this connection to your Electrician and/or nominated Network Approved Connection Contractor.

ELECTRICIAN TO COMPLETE THIS SECTION

Distributed Generation Details

Entirely new installation		} →	Existing ICP Number
Installed in an existing installation (i.e. Switchboard)			
Addition to an existing installation (Containing Generation)			
Primary Energy Source (e.g. Solar)			
Synchronous / Asynchronous			
Rating of Generation Installation (kVA)			
Power Factor			
Rated Terminal Voltage (V)			
Number of Phases			
Location of multi pole isolator			
Proposed Connection Date			

Attachments

Equipment ensuring disconnection of DG on loss of mains to system	
Single line diagram showing protection system	
Circuit Diagram	
Distributed Generator test report	
System complies with Firstlight Network Limited's 'Connection & Operation of DG Document'	
For applications concerning systems > 10 kW, please also complete the 'DG Technical Form'	

ELECTRICIAN TO COMPLETE THIS SECTION

Site Plan Show site boundaries, dimensions, meter location, position of nearest pole or disconnection box, proposed cable route, demarcation point and any thrusting. Where a pole or disconnection box is indicated, provide the pole or disconnection box number. Any application received without a nominated point of connection will be returned to the Network Approved Contractor.

	Point of connection Asset Id
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Inverter

A list of compliant inverters which Firstlight Network Limited accepts can be found on the Australian Clean Energy Council website here: <http://www.solaraccreditation.com.au/products/inverters/approved-inverters.html>

Inverter selected from list of approved Inverters:

Yes No

Inverter Make	Maximum kW Output
Inverter Model	Documentation attached

Electrician

Name	EWRB Registration No
Company	
Phone No	

I declare that the distributed generation installed will comply with the relevant industry regulations and standards including but not limited to Electricity Regulations 2010, AS/NZS 3000 2007 and where applicable AS NZS 4777.

Electrician signature	Date / /
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Firstlight Network Ltd Processing

Engineering check / Approved	
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Application Fee

Date processed

Installations < 10kW (Part 1A) \$100*	
Installations < 10kW \$200*	
Installations 10 - 100kW \$500*	
Installations 100 - 1000kW \$1000*	
Installations > 1MW \$1500*	

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*GST Exclusive

Distributed Generation Technical Form

Note: This is **not** an application for electricity. Allow five working days (from receipt of the completed form by Firstlight Network) for processing for a standard application. Applications are valid for a period of **six months** from the date of approval.

	AFS
	Reference

172 Carnarvon Street
PO Box 1048
Gisborne 4040
Tel 06 869 0700
Fax 06 867 8563
info@firstlightnetwork.co.nz

firstlightnetwork.co.nz

Distributed Generator details (per generator)

Unit Designation (e.g. G1)	
Nominal KVA rating	
Synchronous / Asynchronous:	
Primary Energy Source	
Prime Mover Description	
Nominal Generator Voltage:	
Rated Terminal Voltage	

Terminal Voltage Range	
Turbine / Generator Inertia Constant	
Active Aux. Load at rated Power	
Reactive Aux. Load at Rated Power	
Does Aux. Load Trip with Generator	
Short Circuit Ratio (Synchronous)	

Synchronous Machine Unsaturated Impedance (in per unit, on generator base)

Armature or Stator Resistance (R_a)	
Direct Axis Synchronous Reactance (X_d)	
Quadrature Axis Synchronous Reactance	
Direct Axis Transient Reactance (X'_d)	
Leakage Reactance (X_l)	
Quadrature Axis Transient Reactance for RR Machines (X'_{q})	
Direct Axis Sub-Transient Reactance (X''_d)	
Quadrature Axis Transient Reactance for RR Machines (X''_q)	
Direct Axis Transient Open Circuit Time Constant ($T_{do'}$)	

Negative Sequence Reactance (X_2)	
Zero Sequence Reactance (X_0)	
Earthing Resistance (R_e)	
Earthing Reactance (X_e)	
Earthing Transformer Ratio	
Quadrature Axis Transient Time Constant for Round Rotor Machines ($T_{q0'}$)	
Direct Axis Sub-Transient Open Circuit Time Constant ($T_{do''}$)	
Quadrature Axis Sub-Transient Open Circuit Time Constant ($T_{q0''}$)	
Saturated Sub-Transient Reactance ($X''_{d\text{ Sat}}$)	

Asynchronous Machines

Attach detailed functional description	
Reactive Power Range (kVAR)	

Current Ratio on Excitation (p.u.)	
Pole Pair Number	

Asynchronous Machine Impedances (In per unit on generator MVA Base)

Stator Resistance (R_1)	
Stator Leakage Reactance (X_1)	
Magnetising Reactance (X_m)	

Rotor Resistance (R_2)	
Rotor Leakage reactance (X_2)	

Power Factor Correction Capacitors

Capacitor Total (kVAR)	
Capacitor Step Sizes	

Capacitor Dielectric Losses (kW)	
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Reactive Power and Voltage Control Systems

Attach detailed description	[]
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Settings and parameters	[]
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Governor or Frequency Control Systems

Attach detailed description []	Settings and parameters []
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- Attach single line diagram showing CB's, Disconnectors, VT's, CT's, Capacitors, Transformers.

Connection Circuit Breakers (for each CB)

Equipment Label (eg. CB1)	Nominal Current Rating
Rated Voltage	Short Circuit Rating (3 - Second)

Network Connection Disconnectors

Equipment Label (eg. CB1)	Nominal Current Rating
Rated Voltage	Short Circuit Rating (3 - Second)

Protection Settings

Attach Single Line Diagram showing protection system []	List Protective Devices and Settings []
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Restrictions

Attach details of any special islanding, protection, or synchronising requirements []
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Generator Transformer General Details

Nominal Voltage Ratio including any tertiary windings	Rating of LV Winding
Number of Windings per Phase	Rating of any Tertiary Windings
Rating of HV Winding	Vector Group
	Iron Losses

Generator Transformer Resistance and Reactance

Positive Sequence Resistance (HV to LV)	Zero Sequence Reactance (HV to LV)
Positive Sequence Reactance (HV to LV)	Earthing Resistance
Zero Sequence Resistance (HV to LV)	Earthing Reactance

Generator Transformer Tap Changer

Attach description of Tap Changer []	Number of Taps
Which Winding is Tapped (HV or LV)	High to Low Voltage Range (HI% to LO%)
Step Size (%)	No. and Voltage of Nominal Tap Position

HV Lines and Cables

Name and Conductor Type	Zero Sequence Resistance (Ohm/km)
Conductor Size	Zero Sequence Reactance (Ohm/km)
Length (km)	Capacitance (nF/km)
Positive Sequence Resistance (Ohm/km)	Attach Route Drawing []
Positive Sequence Reactance (Ohm/km)	

Operational Data

Attach Details of any Low Load Restrictions	Hot Start Time to achieve Minimum Load (Thermal Plant)
Cold Start Time to achieve Minimum Load (All Plant Types)	Typical time from Cold Start to Maximum Load (All Plant Types)
Warm Start Time to achieve Minimum Load (Thermal Plant)	Typical Power Ramping Rate from minimum Load to maximum Load

Operational Profiles

Attach Estimated Generation / Demand Profile (in enough []

Distributed Generation Final Application Form > 10kW



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	AFS Reference
	File Reference

172 Carnarvon Street
PO Box 1048
Gisborne 4040
Tel 06 869 0700
Fax 06 867 8563
info@firstlightnetwork.co.nz

firstlightnetwork.co.nz

Applicant Contact Details

Surname		House No.		or Rapid No.	
First name		Address			
Business name		Suburb			
Phone (H)		City/Town			
Phone (W)		Post-code			
Fax		AFS no. of initial application			
Email					

Please attach confirmation that our requirements will be met (Attach supporting documentation as necessary).

- Safety Requirements
- Technical Requirements
- Operational Requirements
- Commercial Requirements

Confirmation that external regulatory requirements such as resource, planning or building consents will be met (Attach supporting documentation as necessary).

- Evidence showing external regulatory requirements have been met

Grid Operator Requirements.

- Evidence showing grid operator requirements have been met

A certificate of Compliance certifying that the generation installation is electrically safe. This certificate must be signed off by both the electrical worker who installed the generation and a person who is a registered electrical inspector under part 9 of the Electricity Act 1992 **and** who is competent with distributed generation.

- Attached completed Certificate of Compliance

Details of energy retailer who will buy the energy generated.

Company: _____

- Attached copy of energy purchase agreement

Details of electrical worker who will connect the generation.

Person: _____

Registration: _____

Declaration

By submitting this inquiry I declare all of the above information and any attached information true and correct. I also acknowledge Eastland Network's full and unlimited right to disconnect our generation should any part of this application prove to be false or fraudulent.

Applicant signature		Date	/	/
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**Post the completed application form to PO Box 1048 Gisborne or deliver to 172 Carnarvon Street, Gisborne.
No Payment is required**



Firstlight Network Ltd, 172 Carnarvon Street
PO Box 1048, Gisborne 4040

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