



Orion New Zealand Limited

Small Distributed Generation Systems

**Information Pack for Small System
(10kW or less) Connections**

Orion
yourNetwork



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Introduction to small distributed generation systems (10 kilowatts or less)

Distributed generators, also known as 'embedded generators', are generators located at a home or business that are capable of generating electricity for that home or business's own use. They may also be capable of putting surplus energy back into Orion's distribution network. These generators can take several forms: solar panels, wind or micro-hydro turbines and diesel generators are the most common.

If you are interested in operating distributed generation and connecting it to our network, there are some things you need to know.

This guide contains information for people interested in connecting small distributed generation systems (10 kilowatts or less) to our network.

Systems of this size are typically installed in homes and small businesses whereas systems greater than 10 kilowatts are typically used by larger businesses.

For more information about distributed generation, please contact:

Gavin Bonnett

Operations Services Manager

DDI: 03 363 9731

Mobile: 027 474 7665

Email: Generator.Application@oriongroup.co.nz

Orion New Zealand Limited

PO Box 13896

565 Wairakei Road

Christchurch 8141

oriongroup.co.nz

Connecting small distributed generation systems

This information is for people who want to connect small distributed generation systems (10kW or less) to Orion's electricity network to generate electricity and possibly export energy into our network. These systems are usually single-phase, but may be three-phase. They are typically installed at residential or small commercial premises.

This information does not apply to generation systems which are not connected to our network.

For information about connecting larger distributed generation, see our Information Pack for Large System Connections which is also available on our website.

Your proposed distributed generation system

If you intend to install distributed generation that will be synchronised with our network, you will need to involve us in the process as early as possible.

The number of small distributed generation systems being connected to our network is increasing rapidly. At the moment the additional energy being injected into our network is not causing network congestion. However there is potential for multiple distributed generation systems in the same area to increase voltage levels and damage your electrical equipment, your neighbours' or our network.

Our Congestion Management Policy (Page 10) outlines how we will manage future congestion from small distributed generators.

Distributed generation must meet all relevant statutory and regulatory requirements and comply with all applicable safety standards. If you connect distributed generation to our network, safety equipment and procedures must be in place to ensure safe interaction between your distributed generator and our network.

More information about distributed generation is available on the Electricity Authority Te Mana Hiko website: ea.govt.nz.

The process for connecting your system to our network

We outline below the steps that you will need to take to connect distributed generation of 10kW or less to our network. This information complies with the Electricity Authority, [Electricity Industry Participation Code 2010 Part 6, Connection of Distributed Generation](#) ("the Code").

Select your system

Usually distributed generation of 10kW or less will be solar powered (photovoltaic panels). Less frequently, it will be wind or micro-hydro generators.

(These guidelines are for distributed generation systems that connect to our network via an inverter. If you want to connect a system to our network without an inverter, please talk to us.)

If your distributed generator connects to our network via an inverter, then the inverter must conform to the relevant standards (Australian Standard 4777.2 and 4777.3) which you can purchase and download from standards.org.au or view for free at your public library. While these standards have been created with solar powered systems in mind, they can be applied to other systems.

You can speed up the processing of your application to connect to our network by using a distributed generation inverter that conforms to the AS 4777.2 standard and is pre-approved by Orion. A list of currently compliant inverters is included on Page 12. We will aim to update this list quarterly.

Contact your electricity retailer

You must discuss your intended distributed generation installation with your current or proposed electricity retailer, as any surplus energy that you generate may be sold to them.

Notify us

At the current levels of connection, small domestic generation systems (typically about 2kW output) are unlikely to have significant impacts on our network. However we need to know where they are connected for safety and administrative reasons. Ideally, you should contact us as soon as you have decided which system you intend to install. The impact of small generation systems increases when several systems are located in close proximity.

Your application

You will need to complete the application form on Page 8 and return it to us, with all the detailed information requested in the form.

It's important that the inverter you are intending to install complies with the AS 4777 standard. If your proposed generator is not on our list of currently compliant inverters, on Page 12, you will need to provide a copy of the Supplier's AS 4777 Declaration of Conformity (proving that the inverter has been type-tested as complying with all relevant parts of AS 4777 by a

laboratory with accreditation issued or recognised by International Accreditation New Zealand).

Application acceptance

We will confirm the receipt of your application within two business days and aim to approve applications involving compliant equipment in writing within five business days - well within the regulatory expectation of ten business days. You must not connect your distributed generation system to our network without our approval.

If, for any reason, you do not receive feedback on your application from us within two business days, please contact us. Under New Zealand's regulations, if your application includes an AS 4777 compliant inverter, and we do not approve your application within 10 working days, then it is deemed to be accepted. It's important that we have a record of all distributed generation installations, so please contact us to receive formal approval.

Application fee

An application fee of \$92 (incl. GST) applies from 1 April 2016. Payment is required with applications received on or after 1 April 2016.

Payment can be made by either cheque, payable to Orion New Zealand Limited and enclosed with your completed application, or by direct credit, to our bank account 03-0855-0345995-03. If paying by direct credit please quote the reference DGAPP together with the house number and street name of the premise where the distributed generation is to be connected and the name of the person or organisation lodging the application. Please do not pay by cash.

If we decline your application

If we decline your application we will detail our reasons and the steps you can take to ensure your application will be successful, if you choose to make a new application. If you disagree with our decision, a dispute resolution process is provided in [Schedule 6.3 of the Code](#).

Connection of generation

Once your system has been installed, you are required to provide a copy of your Code of Compliance (COC) within ten working days.

Metering

You are required to have import/export metering, capable of measuring exported energy from the generator into our network (even if this seems unlikely). Your electricity retailer can arrange this for you.

Your retailer will advise of any rental charge for the meter, which may only be a few cents per day. You may also be charged a tariff/meter change fee, depending on your location and your existing metering.

Installation

Any distributed generation equipment that you purchase should come with manufacturer's installation instructions. Installation must be undertaken by qualified tradespersons to ensure compliance with all relevant building and electrical codes and standards. All wiring associated with the system must be undertaken by a registered electrician, which complies with electricity safety regulations 2010 and AS/NZS 3000 or any successive standard or legislation. You must also check with your local Council whether any building or other consents are required.

If your generator continued to operate when there was a power cut, this would pose a serious safety threat on our network. It could have serious consequences for anyone working on the network and/or could damage your equipment. A system manufactured to AS 4777.2 and with protection systems installed in accordance with the AS 4777.1, will provide isolation and prevent this happening.

Your registered electrician should closely follow AS 4777.1 when installing your equipment. This standard can be purchased and downloaded at standards.org.au.

While AS 4777.1 deals primarily with connection of inverter based systems, its principles should also be followed for distributed generation systems that do not employ inverters.

Generation payments

Your retailer may credit you for the amount of electricity that you export into our network. We support retail credits for export via a reduction in our delivery charges to retailers.

Additional information

For more information about your rights and responsibilities as the owner of a small distributed generation system see the [Regulated Terms for the Connection of Distributed Generation \(Schedule 6.2\) of the Electricity Industry Participation Code](#).

Application to connect and operate distributed generation with capacity of 10kW or less on Orion's network

Details of person/organisation applying to connect distributed generation	Details of customer at premises where distributed generation is to be connected
Name: _____	Name: _____
Company: _____	Company: _____
Address: _____ _____	Address: _____ _____
Phone: _____	Phone: _____
Email: _____	Email: _____

ICP number (from your power account if you are an existing customer): _____

Energy retailer who will purchase your electricity/is responsible for your connection:

Details of your proposed distributed generation

Connection: Existing ☐ New ☐ Residential ☐ Commercial ☐

Any new electricity connections will be processed by our distribution services group.

For all existing electricity connections, and when applying for a new electricity connection, we will evaluate the total export capacity of your proposed distributed generation (i.e. the maximum amount of electricity that your generation is able to inject into our network) to assess whether your proposed generation will exceed the capacity of your electricity connection. To complete this evaluation, we will need information about the size and configuration of your proposed distributed generation system including (if any) battery storage and generation/load control systems for export limiting etc. Please attach to your application a copy of the manufacturer's specifications and/or a photograph of the 'name plates' for your proposed distributed generation system, as evidence of its capacity and control capability. Additional information may be required if the manufacturer's specifications are not comprehensive.

Please be aware that the maximum export phase imbalance shall not exceed 5kW. That is, for a single phase installation the export to the network shall not exceed 5kW and for two phase installations the export to the network will be limited to 10kW evenly spread across the two phases. For a three phase system, the maximum export difference between any phase shall not exceed 5kW.



Fuel type: Solar PV ☐ Gas turbine ☐ Wind turbine ☐ Steam turbine ☐ Micro hydro ☐
Fuel cell ☐ Other (specify) _____

Number of phases: One ☐ Two ☐ Three ☐

Name of electrical contractor: _____

Is your distributed generation system included in our current list of AS 4777 compliant equipment? (See page 12) Yes ☐ No ☐

If not, please provide a copy of the Supplier's AS 4777 Declaration of Conformity.

Make and model of inverter: _____

Manufacturer's rating of inverter: Amps _____ Volts _____
kW _____ kVA _____

Make and model of any battery storage: _____

Total installed battery rating: kWhr _____ kW _____

Does the battery have integrated inverter: No ☐ Yes ☐ If yes, inverter size kW _____

Maximum proposed generation export: kW _____

Please attach the technical specifications of your equipment to show that your proposed distributed generation would automatically disconnect from our network during a power outage (it is important that distributed generation systems isolate from the network to avoid injury to line workers).

Payment of application fee (applies to all applications received on or after 1 April 2016)

Please indicate the method of payment.

Payment method: Cheque ☐ Direct credit ☐

Cheques should be made payable to Orion New Zealand Ltd and enclosed with your completed application. If paying by direct credit please ensure you quote the reference DGAPP as well as the house number and street name of the premise where the distributed generation is to be connected and the name of the organisation or person lodging the application.

Direct credit account No. 03-0855-0345995-03

Declaration

I apply to connect a distributed generator to Orion New Zealand Limited's electricity network and confirm that the above information is correct. I will not connect any generation to Orion's network until I receive written approval from Orion, and I will provide a copy of the Code of Compliance (COC) within 10 business days of connection.

Name: _____

Signature: _____

Date: _____

Please complete all sections of this form as this may delay your application.

For more information about distributed generation, please email us at Generator.Application@oriongroup.co.nz

Congestion Management & Safety

Congestion management policy

Distributed generation on our network has traditionally been installed by individual customers who wish to enhance the security of their electricity supply and reduce their costs associated with peak demand on our network.

The electricity generated has generally been used at the premises where it was generated and at a time coinciding with high network demand.

New forms of distributed generation, such as solar power (photovoltaic panels) are predominantly being installed to reduce the quantity of electrical energy required from the network on a continuous basis. This change in approach can lead to significant amounts of electricity being exported on to our local area network. This is particularly true in the height of summer when photovoltaic output is at a maximum and homeowners may be at work or away on vacation with very little electricity being used in the home.

Our network is mainly engineered so that electricity flows in one direction. Continued growth of distributed generation is likely to create reverse energy flows and congestion on some parts of our network. Typically this will create excessively high voltage, which can damage customers' electrical appliances as well as our network equipment.

At the moment small distributed generators are not causing any congestion on our network but we will continue to monitor this. We will undertake regular assessments (using our database of distributed generation installations and network capacity models) to determine what areas on our network will be congested with the addition of future distributed generation. We will report areas of distributed generation congestion on our network.

Distributed generation can be provided in many different forms, with wide variations in the business model and operational requirements. Congestion management is best determined on a case-by-case basis during the network application process. There are two main ways to manage network congestion:

- by ensuring that distributed generation connection only occurs in uncongested areas or is always accompanied by an appropriate network upgrade
- by agreeing on a case-by-case basis the real-time operational rules that will apply.

The outcome will depend on the nature of the network congestion, the distributed generation operational characteristics and the business model of the proposal.

In line with the pricing principles in the [Electricity Industry Participation Code 2010 Part 6 Connection of Distributed Generation](#), in situations where a proposed generator will add to

(rather than relieve) network congestion, and where this congestion requires reinforcement of the network, we will charge this to the connecting distributed generator.

Future updates to this Congestion Management Policy will detail our approach to managing distributed generation congestion, including operational rules.

In some instances, events on Transpower's national transmission grid may restrict distributed generation.

Emergency response policies

Our emergency response policies are detailed in our Asset Management Plan (Section 6.9.1: List of Contingency Plans). Printed copies are available from our offices at 565 Wairakei Road, Christchurch 8053.

Safety standards

Our safety standards are detailed in our Asset Management Plan (Section 6.3: Safety, and Section 3.3.5: Service Level Measures - Safety). Printed copies are available from our offices at 565 Wairakei Road, Christchurch 8053.

AS 4777 Compliant Inverters

This is a list of AS 4777 compliant inverters that are pre-approved for connection to our network. We will aim to update this list quarterly.

Make	Model	Expiry Date
ABB	PVI-5000-TL-OUTD	18 November 2019
	PVI-5000-TL-OUTD-S	18 November 2019
	PVI-5000-TL-OUTD-W	18 November 2019
	PVI-5000-TL-OUTD	18 November 2019
	PVI-5000-TL-OUTD-S	18 November 2019
	PVI-5000-TL-OUTD-W	18 November 2019
APS	YC500	20 June 2017
	YC250	20 June 2017
Astronergy	CHPI 3KTL-AS	19 April 2018
Canadian Solar	GW1500-SS	1 December 2016
	GW2000-SS	1 December 2016
	GW3000-SS	1 December 2016
Delta	RPI H3A	20 October 2018
	RPI H4A	20 October 2018
	RPI H5A	20 October 2018
	Solivia 3.3A PG3	20 January 2016
	Solvia 3.0A PG3	20 January 2016
	Solvia 2.5A PG3	20 January 2016
EnaSolar	1.5KWGT-AUNZ	12 July 2017
	2KWGT-AUNZ	12 July 2017
	3KWGT-AUNZ	12 July 2017
	3.8KWGT-AUNZ	12 July 2017
	4KWGT-AUNZ	12 July 2017
	5KWGT-AUNZ	12 July 2017
ENPHASE	M215	16 November 2017
	M250	5 May 2019

Make	Model	Expiry Date
	S230	9 November 2020
	S270	9 November 2020
FRONIUS	Galvo Family	17 December 2017
	Galvo 3.1-1	17 December 2017
	Galvo 3.0-1	17 December 2017
	Galvo 2.5-1	17 December 2017
	Galvo 2.0-1	17 December 2017
	Galvo 1.5-1	17 December 2017
	IG-15	
	IG-20	
	IG-30	
	IG-40	
	IG-60	
	Primo 3.0-1	6 May 2020
	Primo 3.5-1	6 May 2020
	Primo 3.6-1	6 May 2020
	Primo 4.0-1	6 May 2020
	Primo 4.6-1	6 May 2020
	Primo 5.0-1 AUS	6 May 2020
	Primo 5.0-1	6 May 2020
	Primo 6.0-1	6 May 2020
	Primo 8.2-1	6 May 2020
	SYMO 3.0-3-S	26 February 2019
	SYMO 3.7-3-S	26 February 2019
	SYMO 4.5-3-S	26 February 2019
	SYMO 3.0-3-M	26 February 2019
	SYMO 3.7-3-M	26 February 2019
	SYMO 4.5-3-M	26 February 2019
	SYMO 5.0-3-M	26 February 2019
	SYMO 5.5-3-M	26 February 2019
	SYMO 6.0-3-M	26 February 2019

Make	Model	Expiry Date
	SYMO 6.7-3-M	26 February 2019
	SYMO 7.0-3-M	26 February 2019
	SYMO 8.0-3-M	26 February 2019
	SYMO 8.2-3-M	26 February 2019
	SYMO 10.0-3-M	26 February 2019
	SYMO 12.5-3-M	26 February 2019
	SYMO 15-3-M	26 February 2019
	SYMO 17.5-3-M	26 February 2019
	SYMO 20.0-3-M	26 February 2019
Giant Power	IGS-3000WM	23 January 2020
GOODWE	GW1500-SS	1 December 2016
	GW2000-SS	1 December 2016
	GW3000-SS	1 December 2016
	GW4000-SS	21 November 2016
	GW4600-SS	21 November 2016
	GW3600-DS	1 March 2017
	GW4200-DS	1 March 2017
	GW4600-DS	1 March 2017
	GW5000-DS	1 March 2017
	GW3648D-ES	1 April 2019
	GW3648S-ES	1 April 2019
	GW4248D-ES	1 April 2019
	GW5048D-ES	1 April 2019
Growatt	Sungold 1000	25 March 2018
	Sungold 1500	25 March 2018
	Sungold 2000	25 March 2018
	Sungold 3000	25 March 2018
	Sungold 4600	25 March 2018
	Sungold 5000	25 March 2018
	Growatt 3600MTL	17 May 2018
	Growatt 4200MTL	17 May 2018

Make	Model	Expiry Date
	Growatt 4600MTL	17 May 2018
	Growatt 5000MTL	17 May 2018
HOSOLA	Smart 1000TL	22 January 2018
	Smart 1600TL	22 January 2018
	Smart 2200TL	22 January 2018
	Bright 2000MTL	22 January 2018
	Bright 2500MTL	22 January 2018
	Bright 3000MTL	22 January 2018
	Bright 4200MTL	22 January 2018
	Bright 5000MTL	22 January 2018
	Bright 2000MTL-S	22 January 2018
	Bright 2500MTL-S	22 January 2018
	Bright 3000MTL-S	22 January 2018
	Bright 3680MTL-S	22 January 2018
	Bright 4200MTL-S	22 January 2018
	Bright 5000MTL-S	22 January 2018
INVOLAR	MAC250A-230-AU	15 August 2016
KLNE	Sunteams1500	7 June 2015
Meikai	MKPV-N220-72-AU-02	10 October 2017
	MKPV-N270-60-AU-02	10 October 2017
	MKPV-N300-72-AU-02	10 October 2017
NEP	BDM-300X2-AU	4 November 2020
	BDM-256-AU	22 November 2017
Panasonic (Integrated battery storage)	LJ-SK84A	23 July 2020
Power-One Aurora	UNO-2.0-I-OUTD-S	30 October 2017
	UNO-2.0-I-OUTD	30 October 2017
	UNO-2.0-I-OUTD-W	30 October 2017
	UNO-2.5-1-OUTD-S	30 October 2017
	UNO-2.5-1-OUTD	30 October 2017
	UNO-2.5-1-OUTD-W	30 October 2017
	PVI-1700OUTD-AU	19 July 2018

Make	Model	Expiry Date
	PVI-2000-OUTD-AU	19 July 2018
	PVI-3.0-OUTD-S	18 November 2019
	PVI-3.0-OUTD	18 November 2019
	PVI-3.0-OUTD-W	18 November 2019
	PVI-3.6-OUTD-S	18 November 2019
REDBACK	SH 4600	15 October 2020
	PVI-3.6-OUTD	18 November 2019
	PVI-3.6-OUTD-W	18 November 2019
	PVI-4.2-OUTD-S	18 November 2019
	PVI-4.2-OUTD	18 November 2019
	PVI-4.2-OUTD-W	18 November 2019
SAMIL POWER	3300TL	22 September 2015
	4400TL	22 September 2015
	5200	22 September 2015
SMA (SUNNY BOY)	SB1700	
	SB3000TL-21	24 July 2017
	SB3600TL-21	24 July 2017
	SB4000TL-21	24 July 2017
	SB5000TL-21	24 July 2017
	SB2500TST-21	24 July 2017
	SB3000TST-21	24 July 2017
SMA	STP 25000TL-30	29 October 2019
	STP 5000TL-20	29 October 2017
	STP 6000TL-20	29 October 2017
	STP 7000TL-20	29 October 2017
	STP 8000TL-20	29 October 2017
	STP 9000TL-20	29 October 2017
	STP 10000TL-10	27 August 2020
	STP 12000TL-10	27 August 2020
	STP 15000TLEE-10	27 August 2020
	STP 15000TL-10	27 August 2020

Make	Model	Expiry Date
	STP 17000TL-10	27 August 2020
	STP 20000TLEE-10	27 August 2020
	WB 3000TL-21	19 August 2020
	WB 3600TL-21	19 August 2020
	WB 4000TL-21	19 August 2020
	WB 5000TL-21	19 August 2020
	WTP 5000TL-20	29 October 2017
	WTP 6000TL-20	29 October 2017
	WTP 7000TL-20	29 October 2017
	WTP 8000TL-20	29 October 2017
	WTP 9000TL-20	29 October 2017
Schneider Electric	Conext RL 3000E	07 August 2018
	Conext RL 4000E	07 August 2018
	Conext RL 5000E	07 August 2018
	Xantrex XW4024-230-50	20 October 2015
	Xantrex XW6048-230-50	20 October 2015
	Xantrex XW4548-230-50	20 October 2015
SolarBridge	Pantheon II	06 February 2018
Solar Edge	SE2200	20 August 2018
	SE3000	20 August 2018
	SE3300	20 August 2018
	SE3500	20 August 2018
	SE4000	20 August 2018
	SE4600	20 August 2018
	SE5000	20 August 2018
	SE6000	20 August 2018
Solax	SK-SU5000	20 November 2018
	SK-SU3700	20 November 2018
	SL-TL1500	8 October 2017
	SL-TL1500S	8 October 2017
	SL-TN1500	8 October 2017

Make	Model	Expiry Date
	SL-TL2200	8 October 2017
	SL-TL2200S	8 October 2017
	SN-TL2200	8 October 2017
	SL-TL2500	4 March 2018
	SL-TL2500S	4 March 2018
	SL-TL2800	8 October 2017
	SL-TL2800S	8 October 2017
	SN-TL2800	8 October 2017
	SL-TL3000	8 October 2017
	SL-TL3000S	8 October 2017
	SK-SU3000	20 November 2018
	SK-TL5000	20 November 2018
	SK-TL3700	20 November 2018
	SK-TL3000	20 November 2018
	SK-BMU1300	20 November 2018
SUNNA	1500TL	11 April 2016
	2000TL	11 April 2016
	3000TL	11 April 2016
	4200TL	11 April 2016
	5000TL	11 April 2016
Sungrow	SG2K5TL-S	04 September 2019
	SG2KTL-S	16 February 2020
	SG3K5TL-S	04 September 2019
	SG3K6TL-D	13 February 2020
	SG3K6TL-S	16 February 2020
	SG3KLT-M	23 August 2017
	SG8KLT-EC	13 April 2020
	SG8KLT-EC	13 April 2020
	SG12KLT-EC	13 April 2020
	SG10KTL	8 June 2017
	SG12KTL	8 June 2017

Make	Model	Expiry Date
	SG15KTL	8 June 2017
	SG20KTL	8 June 2017
	SG30KTL	8 June 2017
Suntellite	SL-TL3000	8 October 2017
	SL-TL2200	8 October 2017
	SL-TL1500S	8 October 2017
	SN-TL1500	8 October 2017
	SL-TL2200	8 October 2017
	SL-TL2200S	8 October 2017
	SN-TL2200	8 October 2017
	SL-TL2800	8 October 2017
	SL-TL2800S	8 October 2017
	SN-TL2800	8 October 2017
	SL-TL3000S	8 October 2017
	SL-TL2500	8 October 2017
	SL-TL2500S	8 October 2017
	SG3KTL-D	13 February 2020
	SG3KTL-S	04 September 2019
	SG4K6TL-D	13 February 2020
	SG4KLT-M	23 August 2017
	SG4KTL-S	04 September 2019
	SG5KTL-D	13 February 2020
	SG5KTL-M	23 August 2017
	SG10KTL	22 December 2016
	SG12KTL	22 December 2016
	SG15KTL	22 December 2016
	SG20KTL	22 December 2016
	SG30KTL	22 December 2016
Wolong	WL-3KSS	24 September 2017
	WL-2KS	24 September 2017
	WL-1.5KS	24 September 2017

Make	Model	Expiry Date
	WL-4KS	24 September 2017
	WL-4.6KS	24 September 2017
	WL-5KS	24 September 2017
ZEVERsolar	Eversol TL1500	23 January 2018
	Eversol TL2000	23 January 2018
	Eversol TL3000	23 January 2018
	Eversol TL3680	23 January 2018
	Eversol TL5000-10	23 January 2018
	Evershine TLC4000	23 June 2019
	Evershine TLC5000	23 June 2019
	Evershine TLC6000	23 June 2019
	Evershine TLC8000	23 June 2019
	Evershine TLC10000	23 June 2019
	Zeverlution 1000S	8 July 2020
	Zeverlution 1500S	8 July 2020
	Zeverlution 2000S	8 July 2020
	Zeverlution 2000S	8 July 2020