

Small-scale distributed generation

New Zealand's electricity is mostly generated in large centralised power stations, which can be a long way from where the electricity is used. It is then moved around the country through the national grid and then to local distribution networks.

Small-scale distributed generation (DG) works differently – electricity is generated from small-scale systems such as photovoltaic modules, small wind turbines and micro-hydro schemes. These generation sources may be used, for example, as electricity sources for businesses, homes or farms. Small-scale DG can be connected to the distribution network and can, by definition, be capable of generating up to 10 kilowatts of electricity – enough to supply up to eight average households. However, DG systems are more commonly smaller than 10kW and are often only capable of supplying part of a household's needs.

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The benefits of distributed generation

Investing in small-scale DG can provide financial benefits to investors by reducing reliance on grid-supplied electricity and can also have a positive impact on the environment. However, the systems can also be expensive to install, and the costs may be greater than the savings achieved from not buying electricity from a retailer in the conventional way. Careful research about the options and costs is recommended before investing in small-scale DG, as there may be other, cheaper ways of reducing power bills or meeting environmental goals (for example, insulation, energy-efficient appliances, utilisation of off-peak rates, LED lighting systems and so on).

The future role of small-scale distributed generation

Small-scale DG is expected to play an increasingly important role in meeting electricity demand as the costs of smaller scale and new renewable technologies decline. Cost is largely reduced due to technology improvements and savings from large-scale production of equipment. In some countries, government subsidies have been used to promote the uptake of DG, particularly solar projects. This has had some negative results, such as disruption to networks, particularly if large numbers of DG installations are concentrated in some areas. In New Zealand, no preference or favour is given to any particular type of generation. The number of DG installations in New Zealand is increasing.



What the owners of small-scale distributed generation need to know

Owners of small-scale DG have rights and responsibilities in connecting to the distribution network and selling electricity. These are set out in the Electricity Industry Participation Code 2010 (Code). They also need to consider requirements under the Electricity (Safety) Regulations 2010, the Resource Management Act 1991, local government policies and codes, and distributor policies and codes.

Connect to the distribution network

To connect to the local distribution network, the owner of the DG system must make sure the system is safe and complies with the network's connection and operation standards. The owner will need to arrange with their electricity retailer to purchase any surplus electricity that is generated and to have a suitable meter installed. Following this, an agreement between the owner of the system and distributor is required, along with inspection and testing. Distributors are required to provide information on DG connection standards on their website. Most distributors' websites also have copies of the necessary application forms and contact numbers of staff who can help with queries.

A distributor needs to know the location and status of small-scale DG connected to its network to ensure the safety of workers who may be working on the network, to avoid damage to nearby electrical appliances due to voltage fluctuations such as momentary outages or power surges and to ensure they can continue to operate their network as designed. The system will need to be installed by a registered electrician, and a certificate of compliance will be required.

The process for connecting to the distribution network is established in the Code. More information on the obligations of distributors and generators under the Code is available on the Authority's website at www.ea.govt.nz/dmsdocument/8590.

Selling the power from distributed generation

The easiest way to sell surplus electricity from small-scale DG is to an electricity retailer. Retailers are not required to buy the power, but most retailers do and have information on their websites on the terms and conditions for purchasing power from small-scale DG.

Retailers are not required to offer a set rate for electricity exported into the distribution network by small-scale DG or to offer a fixed-term contract. The price offered and the contract term will reflect the commercial value to that retailer of the relationship with the customer exporting electricity.

Prices paid by retailers for exported electricity will naturally trend towards wholesale electricity prices. The greatest return on any DG investment will therefore be from reduced demand for imported electricity rather than from the sale of surplus electricity.



Other resources

There is extensive material available about small-scale DG, including:

- Electricity Authority information paper on embedded generation: www.ea.govt.nz/dmsdocument/8580. This document discusses the process and requirements for connecting small-scale DG to a distribution network.
- *Power from the people: a guide to micro-generation*: www.eeca.govt.nz/resource/power-people-guide-microgeneration. This document provides a range of information about small-scale DG.



Fact sheets in this series look at the regulatory framework for New Zealand's electricity sector and the roles of the various parties involved, principally the Electricity Authority as the regulator.