

What is a Microgrid?



Part of Energy Queensland

A microgrid¹ is a group of interconnected electrical loads and energy resources such as solar, wind, diesel generators and batteries operating as a single controllable system that can function independently of the electricity distribution network.

They can range in scale from supporting a single customer to powering an entire community. Grid-connected¹ microgrids maintain a connection to the electricity distribution network while being able to temporarily disconnect and operate in an 'islanded' mode. Stand-alone¹ microgrids have no connection to the network and operate in a permanently disconnected state.

Energex and Ergon Energy Network treat a grid-connected microgrid as an [embedded network](#), and a stand-alone microgrid as a [stand-alone power system](#) (SAPS).

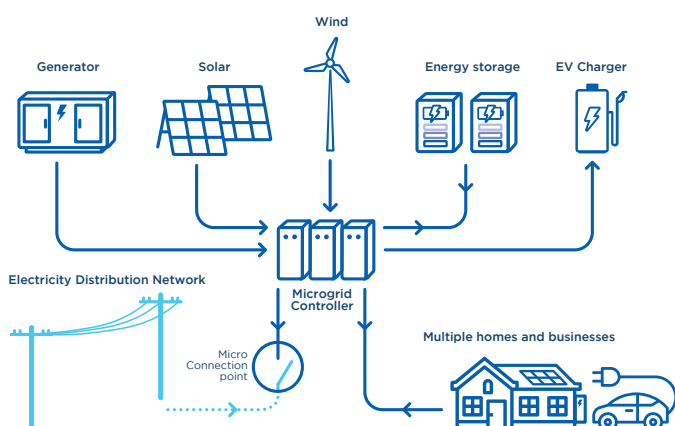
How do they work?

A smart technology microgrid controller co-ordinates the loads and energy resources to optimise the power flows in a microgrid. For grid-connected microgrids, it also controls the seamless connection or disconnection of the system to the network.

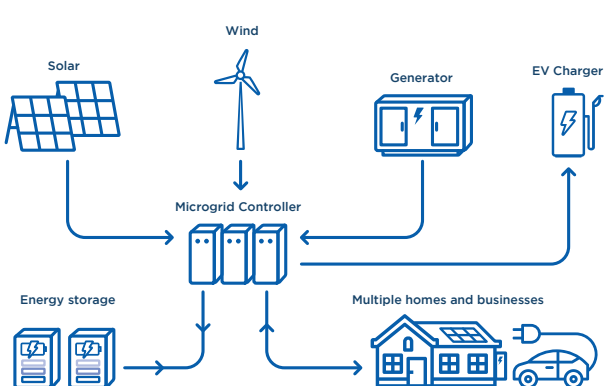
While the energy resources in a grid-connected microgrid have enough capacity to supply the electrical loads, it can disconnect from the network making the system self-sufficient when required. A driver for operating in this mode may be to maintain supply to critical loads during a network outage. While connected to the electricity distribution network, the microgrid controller will also control the import and export of electricity from the network to optimise local use of generation and storage, or to sell excess electricity back into the grid.

Unlike grid-connected microgrids, SAPS are completely reliant upon their own energy resources because they have no connection to the network. SAPS are an option when it is not economically or technically possible to connect to the electricity distribution network.

Grid-Connected Microgrid



Stand-Alone Microgrid



¹ Please note the definition of the terms "microgrid", "stand-alone microgrid" and "grid-connected microgrid" used in this fact sheet are technical definitions based on international standard IEEE 2030.9:2019 'IEEE Recommended Practice for the Planning and Design of the Microgrid'. The definition of the term "microgrid" in the AER's Regulated SAPS context does not include grid-connected systems, referring to stand-alone systems only. The IEEE definition has been used in this document to align with more common use.

Who owns the Microgrid?

Microgrids may be:

- privately owned, like embedded networks or privately owned SAPS, or
- owned by distribution network service providers (DNSPs) such as Energex and Ergon Energy Network.

All electrical network infrastructure in a private microgrid must be owned, operated, and maintained by the microgrid owner. In privately owned grid-connected microgrids, the owner is responsible for their network up to the Connection Point (CP) to the DNSP-owned network.

If you propose to acquire infrastructure owned by the DNSP to create a private microgrid, you must also consider whether the area includes other electrical infrastructure such as public lighting owned by the Local Government Authority (LGA), Department of Transport and Main Roads (DTMR), or other utilities. Transfer of ownership of these assets requires approval from the owner and commercial negotiation based on the function and value of the assets. Some DNSP assets cannot be privately owned due to their role in the operation and security of the electricity distribution network.

Do customers connected to a microgrid still pay a power bill?

In a grid-connected microgrid where the owner is the only customer, the microgrid owner will still purchase electricity supplied from the network through a retailer. For a microgrid supplying multiple customers, each customer can elect to purchase their electricity either from a retailer of their choice or from the microgrid owner.

How to connect a private microgrid to the Energex or Ergon Energy Network

Privately owned SAPS are not connected to Energex or Ergon Energy Network electricity networks and therefore no connection application is required for this type of microgrid. You should be aware that state and national regulations governing the construction and operation of the SAPS will still apply.

It is likely your connection of a private grid-connected microgrid that supplies multiple customers will be treated as an embedded network. A summary of regulatory information regarding embedded networks can be found on this website [Embedded electricity networks](#). A connection enquiry can be submitted through the Energex or Ergon Energy Network portals: [Portals - Energex](#) or [Portals - Ergon Energy](#).

To help determine if a microgrid is appropriate for your requirements, you should speak to a suitably qualified consultant.

What to consider when thinking about creating a private microgrid

Ownership – Who will own the electrical infrastructure in your microgrid? Under present arrangements, you must own the infrastructure in your private microgrid, including any public lighting, and have responsibility for its operation and maintenance. This may require you to negotiate the purchase of existing DNSP, DTMR or LGA assets that are within the proposed microgrid.

Customers – If the private microgrid includes customers who are currently connected to the electricity distribution network, they must **all** provide written consent to becoming a part of the microgrid. This will require the abolishment of their existing connection agreements with the DNSP and may impact their options for energy retailer choice.

Network Regulations – Where a private microgrid supplies multiple customers the microgrid owner may need to register the system with AEMO or seek a network and retail exemption from the AER. Consideration also needs to be given to any Queensland specific requirements. There are a range of regulatory, technical and safety obligations relating to the specification of equipment, the sale of energy, and the operation and maintenance of the system that will apply. More information can be found on these websites: [AEMO - Register as a Network Service Provider \(NSP\) in the NEM](#), [AER - Authorisations & Network exemptions](#) and [Energy | Business Queensland](#).

Storing and Exporting Energy – Will the grid-connected microgrid store or export energy back to the electricity distribution network? Network limitations and dynamic operating envelopes (DOE) may govern the amount of energy that can be imported from or exported to the distribution network and when this is permitted. Read more on [Dynamic Customer Standards](#).

Operating Mode – Will the microgrid run permanently stand-alone with no connection to the main electricity distribution network i.e. is it a SAPS? Will it have a connection to the network and operate in a connected mode for most of the time, only islanding as a back-up function? Or will it operate in an islanded mode for most of the time, only using the network as a back-up? The operating mode will determine the rules and regulations the microgrid must comply with and the type of switching and protection equipment required. See the [Qld Electricity Connection Manual](#) for more information.

For more information visit
ergon.com.au | energex.com.au



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