

## Load Shedding

Load shedding is the term used to describe the deliberate switching off of electrical supply to parts of the electricity network, and hence to the customers in those areas. This practice is rare, but is a core part of the emergency management of all electricity networks.

Load shedding can be required when there is an imbalance between electricity **demand** (customers' usage) and electricity **supply** (the ability of the electricity network to generate and transport the required amount of electricity to meet this demand). In Victoria, widespread load shedding is almost always a result of a deficit or restriction in generation and/or on the transmission network.

When there is a shortfall in the electricity supply, there can be a need to reduce demand very quickly to an acceptable level, or risk the entire electricity network becoming unstable and shutting down completely. This is known as a "cascade" event, and can end in a total or widespread network shutdown affecting very large areas of a country. Some recent examples include the blackouts in northeast America and Canada in 2003 and across Italy in the same year.

In order to protect the overall security of the national grid, it is sometimes necessary for AEMO (the Australian Energy Market Operator) to direct the relevant market participants (distribution and transmission companies) to instigate a localised load shed event, effectively reducing electricity demand by quickly disconnecting consumers from the grid.

### Load shedding normally happens in two ways:

#### Automatic Load Shedding

This is a result of concurrent failures of major element(s) in the national grid (e.g. co-incidental generator or key transmission line failures), resulting in protection schemes initiating the automatic isolation of additional parts of the national grid, to protect the entire grid from cascading to a total blackout. Automatic load shedding always occurs on the transmission system level, with the result being large amounts of electricity and large blocks of customers taken off supply in a very short time. Typical load reduction amounts can be in the order of 1000MW – 2000MW, affecting hundreds of thousands of customers.

#### Manual (Selective) Load Shedding

This occurs where time is available (typically up to 30mins) to make selective choices on what customers are shed. Selective load shedding often occurs on the distribution system level, and typically requires medium to small amounts of electricity to be "shed" in a short time. Typical load reduction amounts can be in the order of 50MW – 100MW, affecting tens of thousands of customers at a time.





If required, manual load shedding can also occur at the sub-transmission level, resulting in large blocks of customers being shed with little to no discrimination between customer types. This situation is invoked when a large amount of electricity (500MW – 2000MW) is required to be shed in a timeframe of typically 1mins to 15mins, often under emergency conditions.

To prepare for selective load shedding, CitiPower and Powercor review all of our distribution feeders on an annual basis. Each feeder is then assigned a priority based on their overall customer mix. These feeders are then ranked against each other, the lowest priority feeders being targeted for load shedding first, the highest priority feeders last to be shed and typically first to have supply restored.

The priority assessment for selective load shedding is based on guidelines which have been ratified by the Victorian Government.

As a guide, feeders that supply major hospitals, mental health care institutions, remand centres, sewerage and water pumping stations, industries requiring continuous supply, major public transport supplies, traffic lights at major intersections, airports and high rise buildings will have a higher priority compared to feeders that have a predominantly residential, commercial or other industrial customer mix.

In order to minimise the impact on individual customers and share the burden, *rotational load shedding* will occur on the low priority feeders if the load shedding duration extends for several hours. Typically the first group of customers who were shed will be restored after one or two hours, at the expense of the next group of customers to be taken off supply. This can continue until the supply/demand equation is balanced again and load shedding is no longer required.

