WHAT IS THE HIGH VOLTAGE TRANSMISSION NETWORK?

FACT SHEET

Transgrid's high voltage transmission network is the backbone of the electricity system that powers our everyday lives.

Transgrid's network is around 13,000 km long, connecting New South Wales (NSW), the Australian Capital Territory (ACT), Victoria and Queensland with bulk electricity from generators. These generators include wind and solar farms, as well as, traditional generators of electricity.

Transgrid transmits bulk energy via its network at between 66,000 – 500,000 volts to key distribution points across NSW and the ACT, to supply local electricity providers.

Transgrid is committed to protecting the safety and health of our employees, our contractors, and the public.

What is an electricity transmission easement?

Transgrid does not own the land that the majority of the transmission network is located on. Instead, Transgrid has easements over the land, commonly referred to as 'rights of way'. Easements are formally acquired interests, registered on property titles.

Easements are in place to:

- Protect the safety of people living, working or playing near electricity infrastructure by controlling activities under or near the network.
- Provide Transgrid with the right to safely access, operate, maintain and upgrade the network.
- Enable Transgrid to undertake vegetation maintenance to prevent bush fire hazards and protect the transmission infrastructure from being damaged.

How wide are easements?

The width of Transgrid easements vary depending upon the operating voltage, design of the transmission line, the length of the conductor span between structures, and the local terrain. Figure 1 shows typical easement widths. Generally, the higher the voltage, the wider the easement required. The specific location and size of an easement across a property is identified on a registered plan of title.

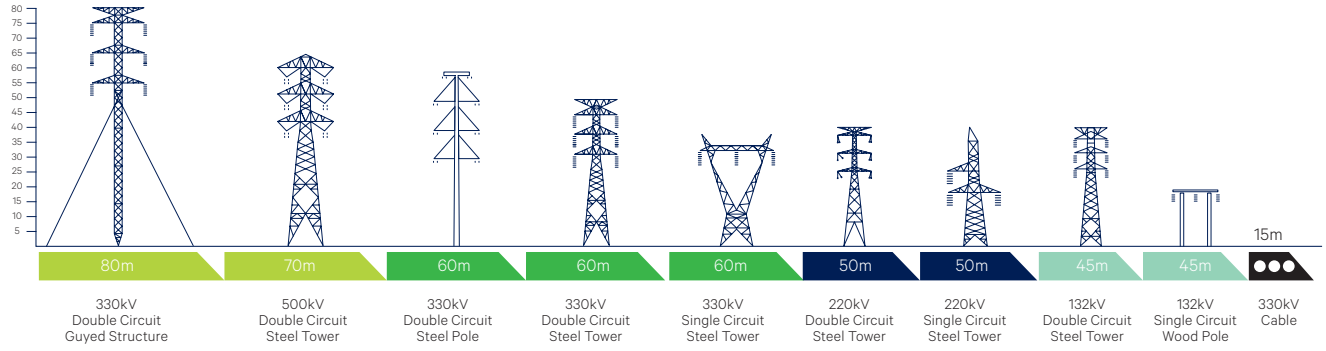

Figure 1: Typical easement widths

What are transmission lines?

An overhead transmission line consists of a series of conductors (metal wires) supported by transmission structures to maintain a safe electrical clearance to the ground. The structures may be lattice towers or poles made of steel, concrete or wood, with varying designs depending on the number of conductors, the voltage and local environment.

At the base of transmission line structures, there are buried earth straps which extend for up to 15 metres from the footings. Structures may also be supported by guy-wires, which extend out from the pole to provide additional strength and support.

Access tracks are required for Transgrid to access and maintain its transmission line structures.

Circuit

A single transmission circuit consists of three phases. Each phase is typically transmitted via a single conductor (wire). For very high voltages, each phase may be transmitted via a bundle of two or four conductors. The distances between wires is required to maintain their insulation and avoid flashover.

Transmission line

A transmission line consists of one or two circuits supported by a steel lattice tower or by a concrete, steel or wood pole. Towers and poles are referred to generically as structures.

Earth wire

Each transmission line has one or two earth wires. The earth wires are designed to protect the circuits from lightning strike, help to reduce the earth potential rise, and assist in ensuring that the circuit breakers turn the voltage off as soon as possible, if there is a fault. Earth wires may contain optic fibre for communications data, which enable real-time monitoring of the network and can identify faults.

Earth strap

An earth strap is for the most part a buried steel strap which is connected through the structure to the earth wire. On steel towers, the earth strap generally extends 15 metres diagonally from each leg. On poles, standard earthing is buried under the butt of the pole, but where soil conditions are poor, there may be additional earthing extending from the base of the pole up to 8 metres in any direction. An exposed earth strap can represent both a safety risk and a bush fire risk under fault conditions. Exposed earth straps should be reported to Transgrid.

Guy wire

Guy wires are installed where poles require additional strength to deal with wire tension or wind. Guys also have a buried earth strap which extends toward the pole for about 2-3 metres. Guy wires are connected to the pole earthing system and can generate earth potential rise under fault conditions.

Footings

A footing is the concrete which encases the pole butt or the tower leg. It can be anywhere from 3-10 metres deep. Due to the large tensions on the structures any excavation within 20-30 metres of a structure may weaken the structure foundation and cause a collapse.

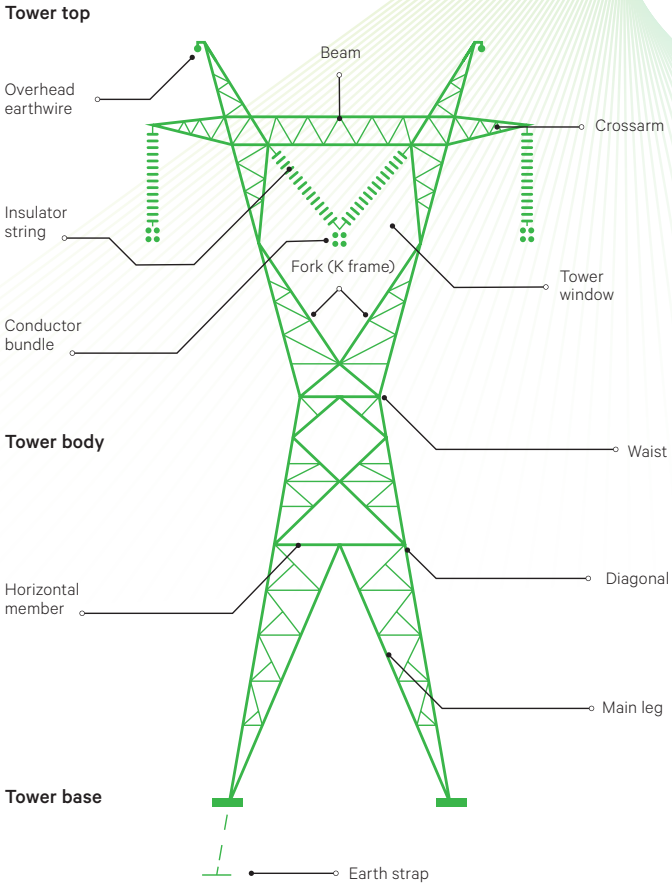

Figure 2: Example transmission tower

What about underground transmission cables?

The majority of Transgrid's transmission occurs using above-ground lines. However, in limited circumstances within Sydney's urban areas and where above-ground transmission is not possible, underground cabling has been installed. As far as possible, cables are installed within road reserves and public land.

Underground transmission cables are installed in an engineered thermal backfill, with the location of the buried cables marked by cable marker slabs. In some places the cable is contained within conduits or concrete ducts or cable bridges. Communications cabling may also be laid in the same trench.

Transgrid

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