Understanding transmission

WIMMERA RENEWABLE ENERGY SOLUTIONS

Transmission is the high voltage transfer of energy from where it is created to distribution networks.

Distribution networks are smaller with lower voltage, supplying energy to homes and businesses.

New transmission is vital for our future

Electricity transmission has been the backbone of our society for more than a century. It is vital to how we live.

We cannot access and use electricity in our homes and businesses without transmission.

The need for new transmission

Australia is undergoing a significant shift in its energy landscape with coal-fired power plants being phased out and new renewable energy sources coming into play.

This shift brings both opportunities and challenges, especially in transmitting electricity efficiently from where it's generated to where it is needed.

Currently, Victoria does not have the right transmission solutions in place to manage the transition to renewable energy generation.

This means we are at risk of having an energy shortfall which could lead to black-outs and load-shedding (supply shutdowns which prevent system collapse) throughout the network

New transmission infrastructure is needed so we can transition to using renewable energy sources.

Choosing the right transmission solution

While it is vital that Victoria constructs new transmission lines, it can be done in a way that minimises impacts to landholders, communities, existing land uses, heritage, and the environment.

This involves careful planning, community engagement, and a comprehensive environmental approvals process.

This is how we are developing WiRES.

In this factsheet:

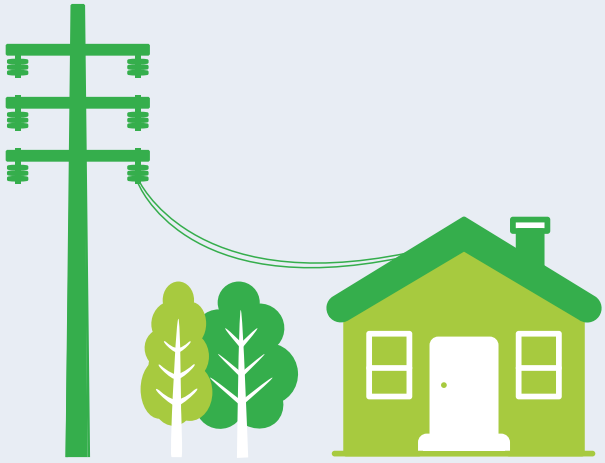
- What is transmission?
- What role does transmission play in the electricity you use at home?
- What are the different types of energy transmission in Australia?
- What is required for overhead transmission?
- What transmission infrastructure will WiRES develop?

What is transmission?

Transmission involves transporting electricity from where it is generated through the distribution network to supply energy for our homes and businesses.

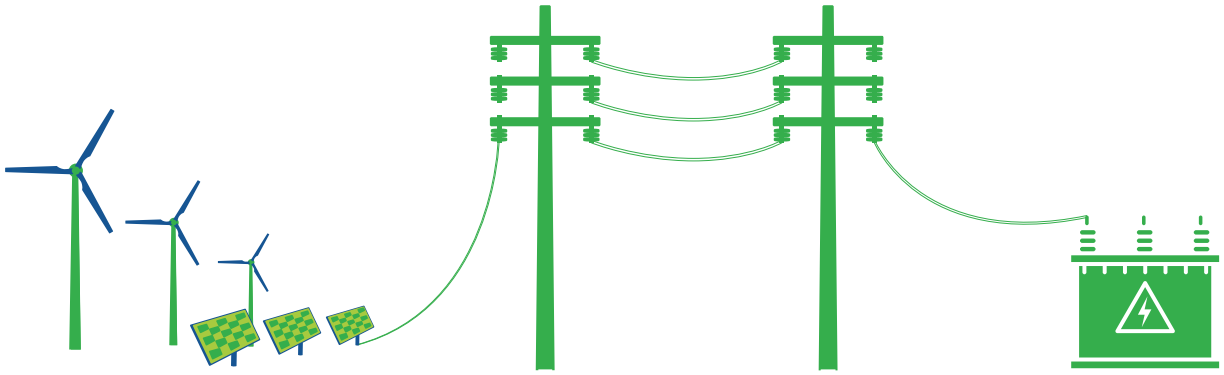
It involves the use of transmission lines, substations, and other infrastructure to ensure a seamless flow of electricity across the electrical grid.

When discussing electricity, 'the grid' refers to a network of interconnected power sources, transmission lines, substations, and distribution points that work together to effectively deliver electricity from power plants to consumers.



What role does transmission play in the electricity you use at home?

When you turn on an appliance at home, you're benefiting from the complex process of electrical energy generation, transmission (and distribution). Here's how it happens:



Generation

Electricity is generated at power plants, which can be powered by traditional sources such as coal, natural gas, or renewable sources like wind, solar or hydro.

Transmission

Once generated, electrical energy is transmitted at high voltages over long distances through large transmission lines which connect to distribution substations.

Distribution

Distribution substations are located close to where the energy will be used and lower the voltage before sending electricity out through the smaller distribution network for use.

What are the different types of energy transmission in Australia?

In Australia, electricity transmission is primarily categorised by voltage levels.

You can think of voltage like water pressure in a pipe. High voltage is like high water pressure.

In the case of electricity, high voltage helps to move the energy long distances with minimal loss to the surrounding environment.

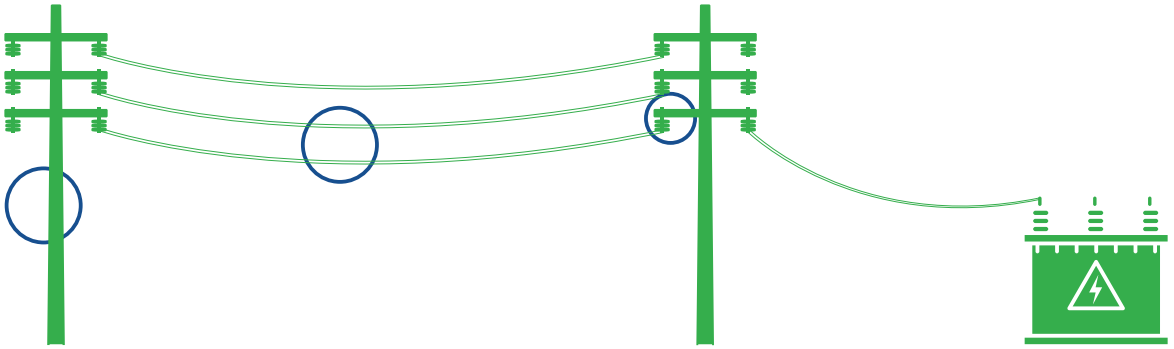
We tend to think of higher voltages (66 kV and over) as transmission because its purpose is to carry or transmit energy over long distances for use in other places.

Everything under 66 kV is typically considered part of the distribution network. It is the kind of voltage carried on timber poles on the side of the road.

Transmission lattice tower (left) shown beside distribution pole (right)

What is required for overhead transmission?

Overhead transmission is the most common method for transporting electricity across long distances. This method involves the use of transmission poles or towers with cables (conductors) suspended above the ground.



Transmission poles or towers

These structures support the overhead lines and are built at the height required between conductors and the ground.

Conductors

These are the cables that carry electricity. They are usually made of aluminum or copper to ensure efficient transmission.

Insulators

Placed on transmission poles or towers, insulators prevent electricity moving through to the ground. They ensure the safe and effective transfer of power.

Substations

A secure compound for transformers and associated materials. These play a vital role in stepping up and down voltage as it moves through the transmission system.

What transmission infrastructure will WiRES develop?

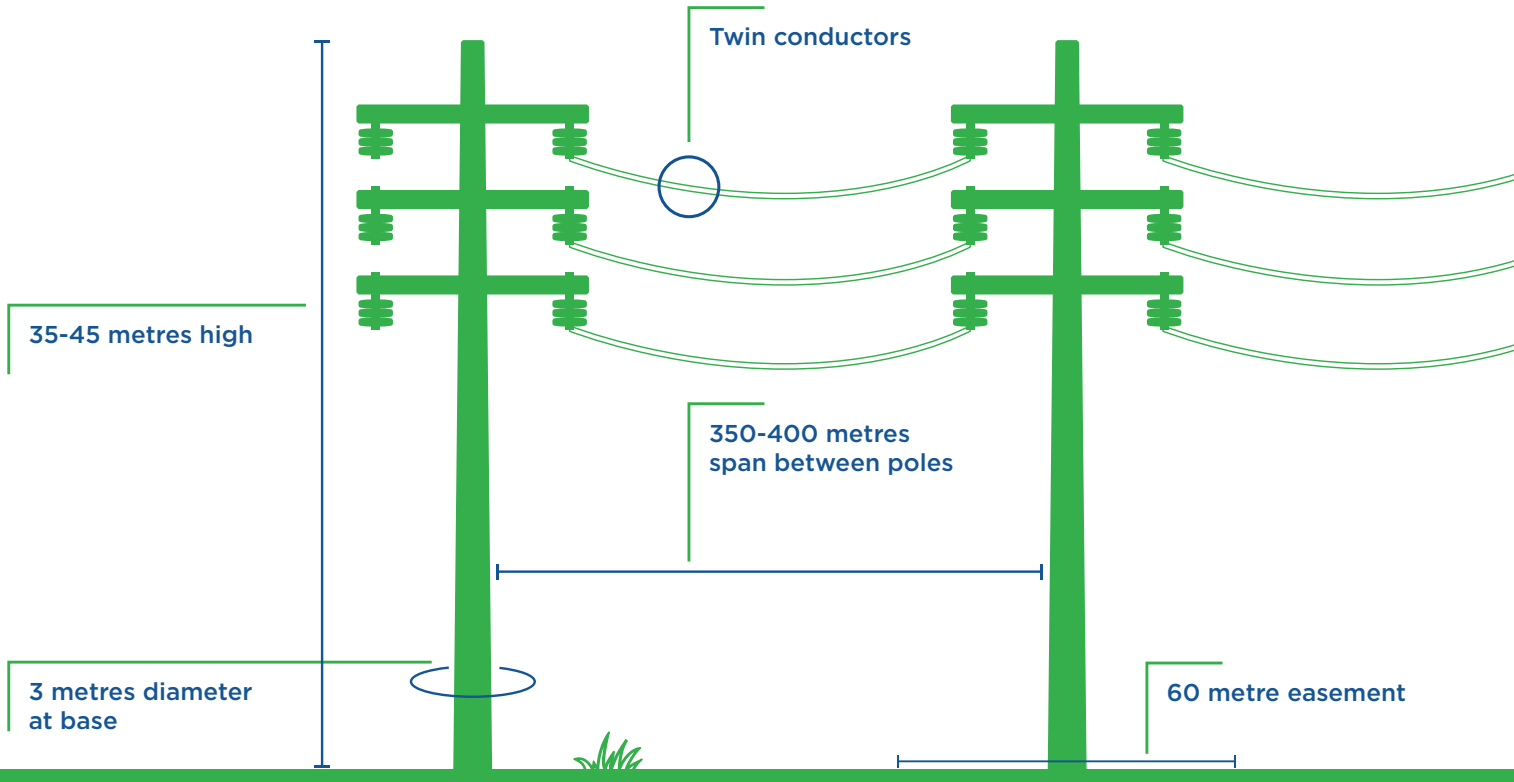
To deliver a coordinated transmission solution for the Wimmera region, WiRES plans to use modern steel monopoles, avoiding bulky lattice towers.

A 330 kV double circuit transmission line is required using steel monopoles generally 35-45 metres high. The typical span between poles is 350-400 metres.

Poles will be an average of up to 3 metres in diameter at the base and sit in an estimated easement that is 60 metres wide. An indicative example is provided below.

Energy is transmitted along the alignment via bundles of wires (conductors), set up in a twin conductor arrangement (i.e. 2 conductors attached to each insulator).

The poles are designed to ensure the conductors are kept at a safe height above the ground.



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