Overhead versus underground transmission infrastructure

The decision of whether to build overhead or underground transmission infrastructure is made early in the design phase after balancing a number of factors including technical feasibility; construction methods and timeframes; environmental, and social impacts; and economic viability.

Some of the typical differences between the two options include:

	Overhead	Underground
Construction	Typically shorter timeframes due to fewer enabling and reinstatement works. Smaller areas of intensive construction, mostly focused at each tower location (every 300-500m).	Almost double construction time with larger footprint and more intensive activity. Wide trenches must be dug for the entire line, then backfilled and reinstated at surface level.
Operation	Faults are easier to spot and be repaired, often within hours to days. More susceptible to environmental or third party damage.	May mean more infrastructure is needed to maintain energy stability over long distances. Faults are hidden and difficult to find, requiring testing, then excavation. Repairs can take days to weeks. Less susceptible to environmental or third party damage.
Safety	Perceived health impacts with potential bushfire risk if clearances not maintained.	Lesser perceived health impacts and reduced bushfire risk.
Cost	Lower cost per kilometre.	Typically, four to ten times more expensive due to materials, additional infrastructure and construction methods required.
Easement restrictions	Wide easement with height limited to 4.1m, with exceptional circumstances to be discussed with Western Power. Allows for some vegetation underneath and some activity, such as farming, excavation, deep ploughing, and use of heavy machinery.	Slightly narrower easement with more activity restrictions such as no building in easement, excavation, deep ploughing or heavy machinery and limited to no cropping allowed. Additional measures, such as concrete protection slabs, may be required above the underground easement.
Visual amenity	Visible towers and wires.	Minimal visual impact, however above-ground structures are still needed for access and when the infrastructure moves from from underground to above-ground.
Future connections	Allows future-proofing of new customer connections as it is easier to uprate, re-string, or add connections as demand and need arises.	Future proofing is possible, but significantly more difficult, with additional trenches for underground cables and longer outages to connect.

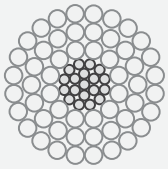
Fact Sheet | Clean Energy Link

Choosing the right transmission for your community

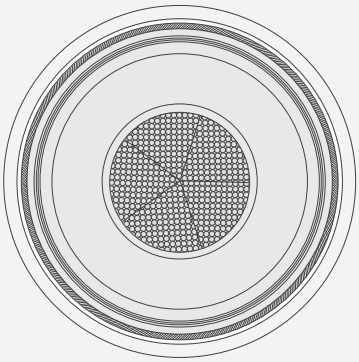
Underground transmission lines are usually used only when they are the most practical or safest option, when they can be:

- Used over the shortest possible distance and only where necessary to achieve a safe, feasible solution.
- Connected to overhead lines with transition infrastructure.
- Installed through open trenching, as this requires more space and can temporarily affect access along roads or easements. Unlike smaller local cables, long transmission cables can't be direct-drilled underground.

Underground cables are thicker as they need insulation, protection and larger conductive cores. This is why they cost more to purchase and install, and require additional infrastructure around them.

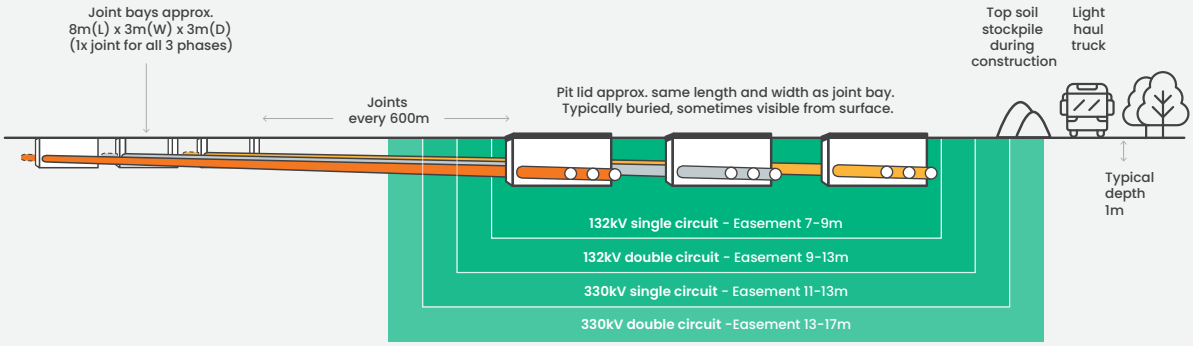


Overhead line cross-section



Underground cable cross-section

Typical high voltage underground transmission cables



More information

Western Power is committed to working with local communities and stakeholders and we'll regularly share project information and updates.

To stay informed, sign up to receive project news.

letstalkpower.westernpower.com.au/clean-energy-link

Scan to learn more

OWNED BY the people of WA