

UNDERGROUNDING HIGH VOLTAGE ELECTRICITY TRANSMISSION LINES

Electricity is commonly transmitted by either overhead lines or underground cables. Overhead lines are normally used to carry electricity at the higher voltages and over long distances. Underground cables are used to carry electricity in heavily built up areas and at lower voltages over relatively short distances.

The electricity transmission network operates at very high voltages and although underground cables are invariably many times more expensive than overhead lines, the cost is not the only reason why underground cables are not commonly used. Very long high voltage cables remain a technical experiment and yet to be proven as an effective engineering option for long distance electricity transmission.

Globally the longest 400,000 volt cable that is wholly underground is 40 kilometres long and has been installed in Japan. Several countries are currently looking into undergrounding technology. Denmark is considering carrying out the world's longest cable test on a portion of one long section in their electricity grid (60 – 100km), however, high voltage underground cables will not be used in the Danish network until these tests prove satisfactorily that underground cables will not compromise the security of the grid. It is estimated that if targeted efforts are made, such tests can be completed by 2018.

The lack of information on how these cables would perform in the long-term is the main reason for the Dutch government's decision to only underground 20km (approximately 25%) of its new high voltage transmission circuit. This section will be undergrounded for particular local environmental reasons.

UNDERGROUNDING THE NORTH-SOUTH INTERCONNECTOR

There have been many calls to underground the proposed new interconnector running from Moy in County Tyrone to Kingscourt in County Cavan.

This proposed North-South Interconnector is 80km in length and will operate at 400,000 volts. For strategic transmission circuits operating at this voltage level and over this distance it is unknown for underground cables to be used.

Northern Ireland Electricity and Eirgrid, the two companies charged by government with building the line, are committed to monitoring closely the testing of high voltage underground cables in order to better understand how these cables could be incorporated safely into a small electricity network such as that in Ireland.

The companies have also commissioned several reports on undergrounding transmission lines in the Irish electricity network. These will be submitted as part of the Environmental Impact Assessment in the planning applications. They focus on the practicality, cost and technical feasibility of placing the interconnector underground. The reports also examine the potential for placing long lengths of transmission circuitry underground and the feasibility of using Direct Current (DC) technology in the Irish network.

Even if it was practical and technically feasible, for this project it is estimated that it would cost electricity customers over seven times as much for underground cables, as compared to overhead lines. It would also be more expensive to operate and maintain an underground cable than an equivalent overhead line.