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Present Use of Overhead Lines and Cables

The changing relative merits of overhead lines and underground cables with increasing voltage are borne out by the lengths of each installed at various voltages in Great Britain.
At the lower voltages (below 11 kV), the difference in the overall costs of new underground cables and overhead lines does not generally preclude cable use. Indeed, in some particularly favourable areas, under grounding is now normally used for new cables up to
11 kV unless particular circumstances dictate otherwise. Very few existing overhead lines
are later under grounded although, in some areas, this has been facilitated by joint funding through amenity schemes.

At 33-66 kV, although full under grounding has been undertaken for amenity reasons in some instances, the high cost and disruption means that each situation is considered on its merits.

At higher voltages, the disadvantages of underground cables in terms of higher capital cost, greater down time due to faults, the potential for greater environmental damage and loss of useful land have precluded their widespread use. High voltage underground cables tend to be reserved for circumstances where overhead lines are impracticable, such as in dense urban areas or sea crossings. In exceptional circumstances, where it has not been possible to avoid routeing lines through areas of designated landscape value, there have been occasions when lengths of underground cable have been installed to preserve the visual amenity.

Future Trends

The understandable desire to minimise the environmental impact of transporting electricity is directed mainly at reducing the visual intrusion of wires, poles and transmission towers.

At low voltages (below 11 kV) an option increasingly used for overhead lines is to replace the individual bare wires by insulated conductors, bunched together to form one cable known as an 'aerial bundled conductor'. While this is larger it allows the adoption of shorter poles, and the result is generally considered to be visually less intrusive. Reliability is also improved and the need for tree lopping to maintain clearance is reduced. For 11 kV overhead lines, a preference is also emerging for insulated conductor lines, allowing the conductors to be suspended closer together.

Efforts are continually being made to reduce both the costs and the environmental impact of underground cables and to improve their reliability.

Guided tunnelling techniques are being increasingly used to avoid trenching or where trenching is not feasible when installing low voltage service cables and some mains cables. Application at 11 kV will follow once a means of providing suitable protection and a surface warning of the presence of a cable in the ground have been agreed. One solution being considered, which has been adopted elsewhere in Europe, is to install the cables in red, medium density polyethylene pipes.

Most new 33 kV and 132 kV cables use extruded cross-linked polyethylene insulation, which dispenses with the need for insulating fluid, and this technology is being extended to higher voltages. Research on gas-insulated transmission lines at 400 kV is being carried out. These 'pipeline' cables are likely to be larger than present cables, but their use of land could be more efficient.

THE ELECTRICITY ASSOCIATION, U.K., 2002/ 08

QUESTIONS :

1/ Quel est le sujet développé dans le document? *(2pts)*

2/ Quel est le plan adopté et le thème de chaque paragraphe ? *(2pts)*

3/ Quel pays de la Communauté Européenne est concerné ? *(1pt)*

4/ A quel voltage maximum répondent les installations souterraines ? *(1pt)*

5/ Quels sont les arguments en faveur des lignes aériennes et souterraines ? *(4pts)*

6/ Quelles solutions sont progressivement adoptées pour les lignes basse tension (soit < 11 kV) au Royaume Uni, dans le reste de l'Europe ? *(5pts)*

7/ A quelle technique a-t-on recours pour les tensions de 33 kV et de 132 kV ? *(5pts)*

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