

Financial aspects of underground cabling

Investment costs:

Generally, investment costs for underground solutions are higher than for an equivalent distance of overhead lines.

Material: One cost driver is the complexity of the technology. There are the expenses for the raw materials of the cables, like copper, and the insulation materials as well as the costs for other components of the technology, most importantly cable joints and transition stations.

Installation: Installation costs are also a key investment factor. Depending on soil conditions as well as possible existing infrastructure that needs to be bypassed, costs incurred for civil works can account for up to 60%

of installation costs. Hence, clarity about the exact cost level of a specific undergrounding project can only be obtained through thorough studies of the local environment, which makes early cost estimations for a specific project quite difficult.



Cable tunnel

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Other cost factors:

Other cost factors are usually much more difficult to determine and sometimes play a role during the full life cycle of a power line. Those factors can be the costs of visual amenity or other externalities, or even avoidable costs like expenses for construction hold-ups. Unfortunately, discussions on how to factor in the cost of not being able to build a line in time are still on going. [A study conducted by the consultancy firm BET](#) on behalf of the Federal Ministry of Environment concludes that if one year can be saved in the realisation of a project due to partial undergrounding, higher investment costs can be neutralised.

Cost Comparison: According to Europacable, average investment costs for undergrounding are about 5-10 times higher than those for overhead lines. However, this cost multiple only applies to the undergrounded section. When considering the entire project, of which only sections may be undergrounded, lower multiples are possible due to potentially faster realisations of projects or lower opposition.

More information:

[Joint paper of Entso-E and Europacable](#): "Feasibility and technical aspects of partial undergrounding of extra high voltage power transmission lines"

[RGI Cable Workshop](#): "Understanding Underground Cables", February 2013 in Switzerland

[RGI Learning Group](#): on "Underground Cables" dealing with questions regarding the choice between overhead lines and cables

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