

UNDERGROUND VS. OVERHEAD DISTRIBUTION WIRES

■ Issues to Consider

When addressing concerns about electric reliability, it is important to keep in mind that over 90 percent of power outages are caused by problems occurring in distribution systems. Distribution systems are the wires running through neighborhoods that carry power from substations and deliver it to homes and businesses. In most American communities, the wires are attached to utility poles and run overhead. In some communities, however, wires and various pieces of equipment are placed underground.

Among the problems that can befall overhead distribution systems are trees knocking down lines; wind, ice, and other storm-related damage; auto accidents; animals contacting wires and transformers; and vandalism. Some say the solution to many of these problems is to place wires underground. However, the cost and maintenance problems associated with underground systems can outweigh their relative benefits. Ultimately, utilities are committed to maintaining high reliability, and the decision of whether or not to place systems underground must depend on local conditions, costs, community preferences, and a host of other factors that vary by each individual community.

Running wires underground has benefits and drawbacks.

Undergrounding's benefits are:

- ▶ Beautification. Overhead wires can be considered unsightly, especially in areas where there are numerous lines.
- ▶ Reliability enhancements. Placing wires underground offers more protection from trees, ice, wind, and other damage during storms; however, power outages may still occur if feeder cables or substations are damaged.
- ▶ Elimination of road hazard/auto accident risks.
- ▶ Reduced vulnerability to vandalism.

Undergrounding's drawbacks are:

- ▶ Cost. Cost estimates vary widely from project to project because of a number of factors, including terrain conditions (e.g., rocks and water intrusion) and the existence of obstacles or barriers, such as roads and structures. The costs of running distribution facilities underground are lower if construction is new rather than if there is a conversion from an overhead to an underground configuration. One utility suggests that a general "rule of thumb" for estimating a range of distribu-

tion line costs is that overhead lines might average \$10 per foot while the same underground line would cost between \$20 to \$40 per foot.

- ▶ Undergrounding creates more complex switching and control needs.
- ▶ Transformers placed underground can have their service lives cut in half because the need to circulate air around them also makes them more vulnerable to rusting.
- ▶ Trenching of streets to lay new conduit necessitates pavement repair costs.
- ▶ Visual inspection of underground lines is impossible, making maintenance far more difficult, costly, and time consuming.
- ▶ Repairing underground lines is usually more complex and costly than repairing overhead lines.

While most communities have chosen to run distribution wires overhead, some communities have placed greater value on the aesthetic benefits of underground systems and have chosen them instead. Again, local conditions and individual community needs and preferences account for the different decisions on whether or not to place wires underground. Regardless of the decision, utilities remain committed to ensuring high standards of reliability.



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