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Facts About Undergrounding Electric Lines

Undergrounding is the process of building electric infrastructure, such as electric distribution lines and other electrical facilities, in trenches underground. Generally, underground lines are located in trenches with other utilities' infrastructure, such as gas pipelines or communications lines. Electric transformers and other equipment are installed on concrete pads above ground or in subsurface concrete enclosures underground.

Undergrounding electric distribution lines is an alternative to installing lines above ground.

- Underground distribution lines cost significantly more to build than above ground lines and typically have a longer construction timeline.
- The cost of undergrounding a distribution line can vary depending on several variables, such as road width (work access), nearby sidewalks (to comply with the Americans with Disabilities Act), density of nearby residences and businesses, surrounding vegetation, the number of power lines involved, other existing structures underground and other environmental issues.

Benefits and challenges of undergrounding

The main benefits of undergrounding are aesthetic improvement in historic or scenic areas and street-side safety in highly congested areas. In some scenarios, underground infrastructure can provide improved reliability during storms.

However, underground lines are not immune to weather damage and are vulnerable to equipment issues, lightning strikes, flooding, earthquakes, and excavation damage by a third party.

When underground systems are damaged, locating fault areas and undertaking excavation processes can be time-consuming. Underground lines can take almost

twice as long to repair when damage occurs.

Undergrounding is also very costly.

- A report prepared by the Edison Electric Institute, “Out of Sight, Out of Mind, An Updated Study on the Undergrounding of Overhead Power Lines,” ([link to report](#)) found that burying above-ground electric distribution systems can cost up to \$5 million a mile in urban areas.
- According to PG&E estimates, it costs approximately \$3 million per mile to convert underground electric distribution lines from overhead. PG&E’s cost to build new overhead lines is approximately \$150 per foot or \$800,000 per mile.
- New underground construction costs vary depending on trenching and paving costs. If paving costs are not included and trench costs are shared between multiple parties (e.g., gas and telephone) the overall new underground costs will be less than conversion costs.

By-the-numbers

PG&E safely maintains approximately 81,000 miles of overhead distribution lines and approximately 26,000 miles of underground distribution lines across its service area. PG&E’s electric transmission system is about 18,000 miles, the majority of which are overhead lines.

In the counties of Butte, Calaveras, Lake, Mendocino, Napa, Nevada, Sonoma and Yuba affected by the October 2017 North Bay fires, 118 miles of the 650 distribution miles are underground. Of the 118 miles, 80 of these underground miles are located in the Santa Rosa area. Most of these underground lines were installed as part of new residential and commercial subdivision developments.

Overhead-underground conversions

Underground conversion has been undertaken by the electric, telecommunication and cable television companies under the jurisdiction of the California Public Utilities Commission (CPUC). The CPUC’s website ([here](#)) describes the underground conversion program and its history through 2014. Electric Rule 20 is the CPUC-approved tariff that governs the overhead electric conversion program, commonly referred to as the “Rule 20 Program.”

The Rule 20 Program consists of three parts: Rule 20A,

20B and 20C.

- Rule 20A projects are paid for by utility customers and are governmental agency requested projects that must be “in the public interest.” Both the electric and telephone utilities must participate in the overhead conversion project. Cities and counties are allocated a certain number of underground conversion work credits through an annual CPUC filing by the utility.
- Rule 20B projects are most often requested by developers to convert overhead electric and telephone lines along streets fronting commercial or residential development areas that include at least one block of existing overhead lines. Typically, 80 to 85 percent of these project costs are paid for by the developer.
- Rule 20C are small projects involving one or more property owners. Typically, these projects are paid for almost entirely by the property owner or owners.

For Rule 20B and Rule 20C projects, PG&E customers will pay a portion of the cost equal to the value of a new overhead line and overhead equipment removal and salvage values.

Investment

Since 2012, more than \$300 million has been invested in converting overhead electric lines to underground as part of PG&E’s Rule 20 program. As mentioned above, not all costs are borne by PG&E customers through rates.

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