

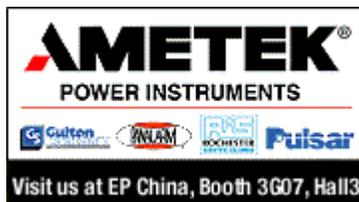
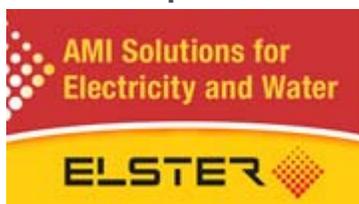
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Hiding Transmission Projects

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When Connecticut-based United Illuminating wanted to build a 69-mile transmission line and place 24 miles of it underground, the idea got a warm reception from the citizens of the affected communities. All in all, the price tag in this case would not be any higher than doing it all above ground because of rights-of-way issues. But despite the good PR, no one likes to have their neighborhoods dug up.

Without a doubt, an underground electrical infrastructure is aesthetically more appealing. And, during periods of extreme weather conditions, it has proven to be more reliable. But going underground is an expensive proposition. The Connecticut case withstanding, the direct costs are much higher than those associated with traditional overhead power lines. Meantime, it is much more difficult to find trouble spots -- and more time-consuming to fix them. The trend, though, is toward placing electrical lines underground and particularly in new communities that are under development.

"On the face of it, undergrounding is the way everyone wants to go," says Kate Shanley, who handles public outreach for United Illuminating. "Cost is a nebulous issue until you get into the nuts and bolts."

Undergrounding has been driven by the inability to accommodate overhead construction, she adds. The Middletown-Norwalk project won't be completed until 2009 in part because of the complexity surrounding the permitting process. For example, the cable must make a river crossing and it appears that the utility will be forced to build a bridge to do that. "People like underground better than overhead but they like it better in someone else's neighborhood," says Shanley.

The Edison Electric Institute funded a study on



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underground transmission lines in 2004. The report concluded that such technologies cost about 10 times that of overhead power lines. And while underground lines suffer a third of the outages as overhead ones, they take twice as long to repair. Specifically, undergrounding is about \$1 million a mile. And the obvious question is who will pay the price of installing that infrastructure?

The utility sector, by-and-large, says it is willing to ante up at least the amount of what it would cost them to go above ground. In fact, it says that about half of the money it has spent constructing transmission lines in the last decade has gone toward undergrounding.

One of the major costs involved with burying power lines is the need to dig trenches. If, however, there is new residential or commercial construction, the effort could accommodate other utilities such as phone and cable companies. The costs could then be shared. The cost is oftentimes split among customers, developers and utilities. In the end, though, it is consumers who ultimately pay through higher taxes or higher rates.

Highest Costs

Lines above the ground come into contact with trees, high winds, rain and ice storms. But, such wires are much easier to repair because they can be visually inspected whereas underground lines require special equipment and crews to locate a fault and to fix. That takes more time and money. At the same time, water can seep underground, and particularly after heavy flooding, that can cause systems to break down.

Florida Power and Light had been resistant to building underground power lines or converting existing overhead lines to underground ones. It said that the price tag was "exorbitant" and that the process to do so was too invasive. In fact, a March 2005 report by the state's public service commission staff estimated undergrounding the entire state could cost up to \$94 billion -- raising electric rates by 81 percent for all.

But, the utility has changed its thinking because of zoning laws in combination with having to endure its fair share of hurricanes. Altogether, about 37 percent of its 71,000 miles of distribution lines are buried underground. Of note, 84 percent of its lines built in newly constructed communities use underground power lines. Going forward, FPL adds that it will pay a quarter of the cost to convert overhead lines underground while supporting municipalities' efforts to win state and federal funding for future endeavors.

The highest expenses are tied to excavation, installation and service connection. In some cases, customers in areas with underground wires will agree to pay extra to cover the costs of construction. Dominion Virginia Power, for instance, is required to collect one dollar a month from residential customers and no more than \$5 a month from



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business customers. The money is escrowed and used to covert overhead power lines to underground.

"Underground distribution lines will improve the potential for reduced outage interruption during normal weather, and limit the extent of damage to the electrical distribution system from severe weather-related storms," says Duke Power, in the institute's report. "However, once an interruption has occurred, underground outages normally take significantly longer to repair than a similar overhead outage."

But there are other variables that businesses and communities take into consideration: reduced motor vehicle accidents, less economic harm as a result of fewer outages and increased property values. And utilities enjoy other advantages, too: fewer greenhouse gas emissions are released, the efficiency of the system is increased and trees do not need to be trimmed to avoid power lines -- all because of undergrounding.

The technologies to build underground lines are also getting better and cheaper. Horizontal directional drilling allows conduits to be placed underground without opening trenches. Similarly, high-voltage insulated underground cables are proving to be more durable while cable trenches located in sidewalks and covered by "pavers" are supposedly easy to remove and allow for simple maintenance.

Cloudy Projections

Some utilities are embracing the potential trend. Pacific Gas & Electric just installed two underground systems. The first is a 230 kilovolt transmission line at a cost of \$221 million. All but three miles of the 27-mile Jefferson-Martin are underground. The second -- the Potrero-Hunters Point Cable -- is a 115 kilovolt transmission line that cost \$40 million and spans 2.5 miles.

Meanwhile, ComEd plans to make a \$190 million investment to increase the electric power supply to the northern portion of the central business district, where consumption continues to grow. The 345 kilovolt, 12-mile line will be mostly underground. "Our customers depend on electricity for their quality of life, and they expect us to operate, maintain and invest in a reliable electricity delivery system to keep up with the economic growth of Chicago," says Fidel Marquez, ComEd's vice president-external affairs for Chicago operations.

Clearly, it's difficult to make an economic case for building underground transmission lines. But, communities are interested in the idea and particularly customers who will live in newly developed areas where costs can be shared among various utilities. Indeed, the aesthetical value along with the possibility of avoiding widespread blackouts has gained credence in the utility world. The stumbling block, though, remains over the issue of who will pay for the advances. And that still clouds the future of

undergrounding.

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