Using Grants to Help Convert Overhead Electrical Lines to Underground

Full Mitigation Best Practice Story

Jackson County, Missouri

Independence, MO—For the City of Independence, removing power lines from utility poles and burying them underground is not just a matter of aesthetics; it's also good business. Through mitigation grants, Independence Power and Light (IPL) buried power lines from distribution line poles to residential structures, proving that this tactic enhances power reliability, reduces property loss, and lessens risk to human life—and it saves money.

Continuously reinstalling downed power lines, which resulted from several storms that toppled trees and snapped branches, did not make financial sense for the municipally owned company. As replacement costs continued to escalate—along with the risk to life and property damages—reversing the "reinstalling" trend became a priority.

"We are not offering customers a service by repeating what we did three or four decades ago. We have to quit pouring money into [downed power lines in] storm after storm and start finding ways to benefit customers and reduce future damages," said Jack Looney, district engineering planner supervisor at Independence Power and Light. "We can do that through underground utility services."

The ice storm of 2002 crippled the area, leaving over 2,000 of IPL's 47,000 residential customers without power and some of whom suffered utility-related property damages. For most, the average electrical outage was six days. Storm damages exceeded $1.4 million. Transmission and distribution lines were down; one lineman was fatally injured while repairing services.

"It's not the ice on the lines that causes the most damage, but the weight of ice on adjacent trees that fall and force power lines down," Looney said.

The storm was declared a Federal disaster, and mitigation funds became available through the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP). HMGP provides funding to State and local governments to implement long-term hazard mitigation measures and recover from major disaster declarations. FEMA can fund up to 75 percent of the eligible cost of each project.

"By converting overhead electric services underground, our goal is to reduce our customers' vulnerability to danger, restore power for more customers in a shorter period and reduce the expense of repairing services as well as property damages, additional crews and other overhead services," Looney explained. "Reinstalling overhead lines following a major ice storm as 2002 is a 14-day event. It takes about seven days to repair the main distribution system and the rest of the time is spent putting services back up."

Teaming with Missouri's State Emergency Management Agency (SEMA), IPL sought mitigation grants to facilitate the underground conversion of service distribution lines to 1,200 high-risk residential customers. IPL set out to prove that moving utility lines underground is good mitigation.

Success of the grant application primarily rests on complying with FEMA guidelines—the project must conform to the State Hazard Mitigation Plan, provide beneficial impact upon the designated disaster area, conform to environmental regulations, solve a problem independently and be cost effective.

"I can't say enough good things about the folks at SEMA. They had their arms about our shoulders, tutoring and advising us," Looney added. "It's most valuable to verify every statistic on the application. Prove it, document it—document and document."

For HMGP projects to be considered cost-effective, a project has to return more money over its life than it cost initially. If the benefits exceed the costs, the project is cost-effective. At the onset, IPL honed in on details of every aspect of the application by:

• Recruiting various national and local weather services. IPL detailed the damaging impact of ice storm events dating from 1959 including specific damage and repair information. As the weight of ice on trees is a major culprit of downed lines, extensive data on indigenous trees by type was added, citing national studies.

• Providing maps that specified proposed project locations most susceptible to damages from ice storms, detailing ice thickness and frequency; and mapping all service lines damaged since 1991 by section locations.

• Detailing descriptions of the project such as underground conduit and trenches, meter socket replacement, conductors and riser, as well as project management information.

• Specifying details on trenches, directional boring, underground residential services, above grade secondary pedestal, and below grade secondary pedestal with detailed engineering charts and plans.

• Explaining other mitigation opportunities with details as to why converting overhead lines to underground is the best alternative.

• Justifying how the conversion project solves the existing problem.

• Providing information on Floodplain Management and Protection of Wetlands and environmental considerations.

• Utilizing FEMA's Benefit Cost Analysis (BCA) Software—Riverine Limited Data Module, commonly used for flood projects, which is also used for ice storms. IPL denotes mitigation cost with descriptions of number of services to convert and unit price basis documentation, inclusive of base year of cost, mitigation project useful life, and economic discount factors. The frequency-damage method of limited data module shows how often natural hazard events occur and how much damage and loss occur as a result of the event, before and after mitigation to determine mitigation benefits: specifically economic impact of loss of electric power, physical damages, casualties, and loss of function by days.

By combining details and documentation, IPL proved its mitigation project reduces risk and saves money. FEMA awarded IPL $1.5 million in HMGP funding to convert over 1,200 residential utility services underground. SEMA administered the funds.

As other residential customers were still at risk, IPL utilized similar strategies and successfully applied for and has been awarded five other FEMA grants including two Pre-Disaster Mitigation (PDM) grants. FEMA's PDM grants provide funds to state and local governments to implement mitigation plans and projects to reduce risks to life and property prior to disaster events. PDM grants are awarded on a competitive basis and FEMA can fund up to 75 percent of the project cost.

IPL has been awarded six FEMA grants totaling nearly $11 million in funding to bury overhead electric distribution lines for more than 9,000 at-risk residential customers. The company continues to vie for other mitigation grants.

"I'm excited about moving overhead service lines underground, and I'm on board as long as needed. In my entire career here, I've not experienced a more positive program. The conversion has been well received by the community, people are asking for the service, the council is applauding it," Looney exclaimed. "It's a new era; the technology is here and the industry should make policies and find ways to benefit customers through underground services. Converting every home in Independence won't happen in my lifetime, but it's coming."

And the move to convert prevails seeing that IPL requires underground utility services for new customers, additions, upgrades; and customers who received multiple tree and power line damages following storms. In some cases the company subsidizes customer expenses to convert. Over $1 million of the annual budget is earmarked for utility conversion projects especially along roadways that will benefit the public at large.

"If an ice storm hits, we'll shave considerable time off our restoration, and far more people will have lights faster. I'm convinced that our work through FEMA's mitigation funds makes the community far better off than in 2002," said Looney. "I can't promise you won't ever be out of lights, but we certainly can do things to reduce it."

Activity/Project Location

Geographical Area:	**Single County in a State**
FEMA Region:	**Region VII**
State:	**Missouri**
County:	**Jackson County**

Key Activity/Project Information

Sector:	**Public**
Hazard Type:	**Winter Storm; Severe Storm**
Activity/Project Type:	**Utility Protective Measures**
Activity/Project Start Date:	**01/2003**
Activity/Project End Date:	**Ongoing**
Funding Source:	**Hazard Mitigation Grant Program (HMGP); Pre-Disaster Mitigation (PDM)**
Funding Recipient:	**Lifelines - Gas/Electric**
Funding Recipient Name:	**INDEPENDENCE POWER AND LIGHT**
Application/Project Number:	**UNKNOWN**

Activity/Project Economic Analysis

Cost:	**$11,000,000.00 (Estimated)**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster?	**Yes**
Federal Disaster #:	**1403 , 02/06/2002**
Federal Disaster Year:	**2002**
Value Tested By Disaster?	**No**
Repetitive Loss Property?	**Yes**

Reference URLs

No URLs were submitted

Main Points

No Main Points were entered.

Workmen survey ice laden trees