Improving Reliability - Distribution Automation

LUCELEC is constantly working on improving system reliability. Reliability, simply put, is fewer and shorter power outages for customers. This is a central plank of the Company's mandate. It is an objective that has been pursued relentlessly over the years, employing several strategies, and always with an aim of keeping the cost of electricity to customers as low as possible. The latest strategy in this effort is distribution automation.

In layman's terms, distribution automation means automatically and remotely controlling the Transmission & Distribution system (all the equipment which gets electricity from the power plant to customers).

The programme began in 2009 and involves the installation of auto-reclosers and automated load break switches at various points on the system. The auto-reclosers assist in isolating faults on the 11 kilovolt (kV) distribution system (commonly referred to as the high tension power lines) so that a smaller area and fewer customers are affected by power outages if there is a problem on the system. They also help LUCELEC identify much more quickly on which section of the network the fault has occurred, thereby reducing the time it takes to effect repairs and restore service. The automated load break switches allow system control operators to quickly reconfigure the system at a click of a mouse to minimize the impact of faults on customers and on reliability.

To truly appreciate distribution automation it is necessary to review the process for manually isolating a fault on the system and effecting the repairs. Prior to distribution automation if a fault occurred on any of the main feeders (Canaries for example) it would probably mean all customers from Cul de Sac to Canaries (about 4,000) being out of power while a Trouble Call crew was dispatched to the site The crew would have to physically inspect the 11kV lines along the route to identify the faulty section of the line. They would then have to manually switch or isolate the faulty section. That meant driving to the Load Break Switch closest to the fault to operate that switch. When the switching was done, the unaffected sections of the feeder could be re-energised (power restored), so that only customers on the faulty section would continue to be without power while the fault was repaired. This process could take anywhere between 45 to 90 minutes, just to restore power to those unaffected by the faulty section.

With distribution automation, this isolation of the faulty section of the feeder can now be done from the System Control Desk literally within seconds. This means that instead of the entire feeder (4,000 customers) suffering a power interruption, depending on the location of the fault, perhaps no more than 300 or so within the immediate vicinity of the fault would be without power as all the load switching could be done automatically and remotely. The trouble call crew would then go directly to the fault site and make the repairs. This would also reduce the time to locate the fault thereby reducing the time that the fewer customers who suffered the interruption would be without power.

During 2010 the auto reclosers prevented a total of 164,205 customer interruptions, which equates to an average of 2.8 outages per customer. This also reduced customer outage time by an estimated average of 1.4 hours per customer. This year additional automated load break switches and auto-reclosers will be deployed on the system pushing LUCELEC closer to its goals for system reliability.

Comments on this article can be emailed to connected@lucelec.com [1].

Links
[1] mailto:connected@lucelec.com