

Gain ultimate reliability for your utility system

Yukon Feeder Automation turns sustained outages into momentary interruptions

Specifically designed to improve reliability, the Eaton Yukon Feeder Automation (YFA) system dramatically reduces the duration and scope of utility outages — driving down SAIDI and SAIFI metrics, reducing costs and enhancing overall operations.

Background

Utility companies are under increasing pressure to improve reliability by reducing the frequency, duration and scope of customer outages. While agencies are constantly seeking innovative technologies to help bolster system performance, maximize service and improve SAIDI/SAIFI metrics, many of today's distribution automation solutions are unable to effectively address these goals. Hindered by challenges including limited functionality, complex or insufficient integration capabilities, and difficulty managing and modifying the system after installation, utilities often struggle to implement viable solutions.

Some utility companies have turned to FLISR (fault location, isolation, and service restoration) as a means to improve distribution system reliability — with extremely encouraging results. A 2014 Department of Energy study¹ of five utilities that had deployed a FLISR system found that the solution reduced the number of customers interrupted by a sustained outage by up to 45 percent, as well as slashed the minutes of interruption by up to 51 percent.

For FLISR systems to be successful, they must have reliable information about operating conditions, seamless device integration, and a robust set of tools that allow utility engineers to quickly and easily change automation settings, which allow the FLISR system to adapt to an ever-evolving distribution grid.

Yukon Feeder Automation enhances reliability, reduces sustained outages

Eaton's Yukon Feeder Automation system is a FLISR solution that enables utilities to reduce the scope and length of outages — restoring connections in just 30 seconds to two minutes. YFA simultaneously maximizes system performance and scalability, providing easy device integration and flexible communications to help utility companies transform their distribution automation system into a seamless, integrated process.

The server-based YFA application is built upon a centralized communication architecture that promotes three core capabilities: fault management, voltage loss management and load management. Offering exceptional flexibility in how data is obtained, YFA is configurable, easy to manage and scalable to meet changing system needs. The simplified model and configuration process make it easy for a utility to scale YFA from a basic pilot project all the way up to a comprehensive system rollout featuring several hundred devices controlled by a single server.

YFA is able to accomplish these critical and distinctive advantages through the system's many strengths, which include:

Easy device integration — By supporting an extensive range of field devices from multiple manufacturers — without requiring additional hardware — YFA allows utilities to leverage their existing communications equipment with no obligation to lock into a specific brand of relay, switching device or recloser control. YFA not only integrates with dozens of existing field devices, it will also support newly introduced devices through regular software upgrades, evolving with a utility company's needs.



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Open communication protocol support — With the ability to gather data from a multitude of protocols — including DNP3, IEC 61850, among others — YFA reduces communication burdens when implementing manufacturer-specific protocols.

Flexible communication medium support — Because YFA gathers data across a wide variety of communication mediums, it can be deployed with confidence as a solution that will perform on a utility's communication network today and into the future. YFA supports point-to-point radios, mesh radio networks, cellular modems, DSL connections, fiber optic links, serial, TCP/IP, UDP, IPv4 and more.

Minimal lineman training — By adapting to the specific work practices of each utility, YFA doesn't require lineman and other operating personnel to become automation system experts. With a base level of conservative, safe switching in response to system events, YFA can be further configured to restrain operation under a number of different industry safe-work practices.

Dynamic operation — The ability of YFA to reevaluate and reassess system conditions in many different states makes it possible for utilities to re-energize more customers without operator intervention, freeing personnel and field crews to restore customers in the damaged area of the feeder. YFA can respond to system events in both the "normal" and off-nominal system states, as well as to multiple simultaneous events in the same area.

Simulation — YFA's built-in simulator allows users to test a variety of system configurations and responses under both normal and abnormal power conditions, reducing concept-to-installation time and minimizing the learning curve for engineers and operators alike. Residing on any Windows PC, the YFA simulator is also a powerful tool for training, testing, quality assurance, and commissioning which will enhance the organizations confidence in the solution.

Distributed Energy Resource integration — Because it is capable of integrating with Distributed Energy Resources (DER), YFA helps utilities overcome two primary problems with automatic restoration following a localized de-energization event. With its wide area view from many field devices, YFA is able to ascertain the DER's contribution to the feeder and account for any load it may have been masking. In addition, YFA can account for true capacity on adjacent feeders — instrumental when considering possible feeder restoration sources to avoid potential system overloads.

Overload protection — YFA protects an electrical system's most critical assets, including substation transformers. With the ability to monitor system loading either directly or indirectly, YFA can limit the amount of load that a substation transformer is allowed to pick up in response to an event, preventing the distribution automation system from harming costly assets.

Event feedback — With the ability to produce a variety of event feedback, YFA places a wealth of information in the hands of utility operators and engineers. Reports summarize every outage and response taken by the system, categorizing each event as fully successful, partially successfully, unsuccessful or no automation possible (and if not fully successful, also specifying the primary reason). In addition, highly detailed logs and a convenient viewer tool provide utility companies with the feedback needed to continually evaluate objectives and implement improvements around their distribution automation systems.

Conclusion

Eaton's YFA system bolsters utility system reliability by isolating faulted line sections and automatically re-energizing the unaffected line sections, dramatically lowering the size and duration of customer outages. Because it is highly configurable, maintainable and scalable, YFA provides utilities with a FLISR solution that can expand and grow with their distribution system as needs dictate, affording complete system ownership.

¹*Fault Location, Isolation, and Service Restoration Technologies Reduce Outage Impact and Duration. December 2014.*
https://www.smartgrid.gov/files/B5_draft_report-12-18-2014.pdf

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