

How Utilities Can Boost Grid Reliability with a Distribution Automation System

BACKGROUND

In today's increasingly demanding energy landscape, utilities are under constant pressure to provide reliable and efficient power to customers. One key solution to this challenge is the adoption of distribution automation (DA) systems, which offer benefits including improved system reliability, enhanced crew safety and reduced outage durations.



Only about 30% of U.S. power distribution systems had adopted automated switching by the beginning of this decade, according to the American Public Power Association's 2020 Distribution System Reliability and Operations Survey Report. Drawing on the expertise of G&W Electric, a leading provider of power grid automation solutions, this article explores the growing need for utilities to adopt DA and how to pick the best project vendor for grid-automation projects.

The Why and How of Distribution Automation

DA involves the integration of intelligent devices, communication networks and software applications to automate various tasks on the power distribution grid. This allows utilities to respond more quickly and accurately to system events, leading to improved reliability and reduced outages. With DA, faults can sometimes be resolved without having to send a truck with workers to fix the issue, leading to labor cost savings as well. If a fault has occurred, power can be restored to unaffected areas prior to a truck being sent to repair the damaged or faulted area or device.

DA offers significant benefits for utilities worldwide, including:

Reduced SAIDI and SAIFI: Utilities implementing G&W Electric's DA solutions have achieved significant reductions in System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI), key metrics for measuring system reliability. That's due in part to the factory acceptance testing process G&W Electric completes before shipment to minimize downtime during commissioning and help ensure reliable long-term performance.

Improved crew safety: Automated systems reduce the need for crews to work on live lines, minimizing the risk of accidents.

Enhanced customer satisfaction: Shorter outage durations and faster restoration times lead to improved customer satisfaction.

How to Select a DA Platform

Here are the critical capabilities utilities should look for when evaluating DA platform vendors, and how G&W Electric's flexible, scalable LaZer® automation platform stacks up:

Fault location, isolation and service restoration (FLISR): G&W Electric's patented technology automatically identifies faults, isolates them from the rest of the system, and restores power to affected areas in minutes, seconds or even cycles, significantly reducing outage times. Communication schemes are not required to implement FLISR, but they enhance automation capabilities by offering real-time insights for swifter and more sophisticated responses, especially with a larger number of devices. Non-communicating loop schemes also can be implemented such that reconfiguration decisions are based on voltages, currents, and operations within the circuit (typically limited to 15 devices). LaZer® automation solution can handle both types of schemes.

Script- and model-based automation options: G&W Electric is capable of providing either type of solution. They have experience implementing automation on systems as small as a single switch to as large as 32 switches in multi-loop configurations. While script-based solutions rely on preprogrammed logic, model-based solutions leverage real-time data and system modeling for dynamic adaptability. The choice between the two hinges on the scale of your current system, the need for future scalability, and the complexity of user-definable contingencies.

Full system integration of new and existing components: These include switches, relays, communication, and supervisory control and data acquisition (SCADA). G&W Electric offers seamless, single-contact integration with existing infrastructure, as well as a vendor-agnostic third-party approach to implementation.

Advanced analytics and reporting: LaZer® automation solutions provide real-time insights into system performance, enabling utilities to identify potential problems before they occur and optimize their maintenance schedules.

Cybersecurity: G&W Electric takes cybersecurity seriously and incorporates robust security measures into all its DA solutions.

Included training for all key parties: G&W Electric gives utilities the full knowledge they need to independently embark on future expansion projects.

How to Choose Reclosers That Support DA Grids

A major utility DA program should source reclosers specifically designed to support grids with automated power distribution. G&W Electric's Viper®-ST recloser is the ideal complement to the LaZer® automation platform. This innovative recloser is designed for automation-ready operation and offers several key benefits:

Solid dielectric technology: The Viper®-ST recloser employs solid dielectric technology. With no air or gas to check, the need for maintenance is reduced.

Wide range of ratings: The Viper®-ST recloser is available in 15.5kV, 27kV and 38kV ratings, making it suitable for a variety of applications.

Site-ready designs: All Viper®-ST recloser accessories come to the site preassembled.

Dead-front operation: The Viper®-ST recloser's magnetic actuator system provides local and remote operation of the recloser on battery backup if AC source power is lost or interrupted. In addition, built-in wildlife protectors reduce the threat of wildlife-caused wildfires.

Overcoming Obstacles to Success

Before embarking on a distribution automation project, utilities should consider the following potential roadblocks and craft strategies to overcome any that may be likely to impact their plans:

Union pushback due to the mistaken belief that DA eliminates jobs. The best way to overcome this barrier is by showing the union exactly what DA does and how it helps employees do their jobs more safely. The earlier the union is looped in on the plans, the easier it is to secure buy-in.

Workers to maintain the system and keep it updated. In addition to physical infrastructure, DA projects typically require additional human maintenance, which unions should be glad to hear. As utilities scope the full project, they can see what types of efficiencies may offset the additional labor needs.

Proving the value to upper management. Between the time, money and people investment required, it can be a challenge to get upper management/investors onboard. The more detailed the ROI forecast, the better.

Navigating PUC approvals. For areas where utilities are overseen by public utility commissions

(PUCs), there can be a chicken-egg issue: money is needed to improve the infrastructure, but PUCs are hesitant to give out rate increases before seeing the reliability improvements. Showcasing the reliability gains seen in similar projects can help in that regard—so can benchmark guarantees, if needed to close the deal.

Scoping needed pre-project infrastructure upgrades. Before moving forward with a DA project, basic infrastructure upgrades may be needed to accommodate it. That can include more reclosers, cap banks, voltage regulators, radios, additional fiber, poles, cabling and more. These need to be budgeted for up front to avoid springing any unwanted surprises on stakeholders.

CONCLUSION

The Future of DA Is Now

As the grid continues to evolve, DA plays an increasingly important role in ensuring power distribution reliability and efficiency. By investing in an industry-leading DA solution, utilities can ensure they are fully prepared to meet rising needs for seamless power distribution in the safest, most efficient, reliable and resilient way.

G&W Electric is well positioned to support the DA trend with its innovative product line, consultative service, long system warranties and full support during the critical first years of implementation. The company has more than 40 years of experience in delivering future-proof solutions for overhead and underground applications, as well as deep expertise in automated switches and automation software.

With all that, G&W Electric's LaZer® DA platform and Viper®-ST recloser offer a powerful combination for improving system reliability. In addition, the recloser solution is equipped with a variety of communication options, allowing for seamless integration with the LaZer® automation platform and other DA systems.

Ultimately, whichever vendor a utility selects, the time to embrace DA is now.

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