

Automation Solutions

The Utility Challenge

- Improve equipment and network reliability
- Reduce operations & maintenance budgets
- Improve enterprise wide access to operational and non-operational data
- Enhance network security
- Maximize useful life of existing substation assets
- Enhance ability to provide on-demand energy
- Respond to regulatory and competitive pressures
- Address loss of experienced personnel familiar with old equipment

Why Automate?

- Acquire and distribute large amounts of real-time data
- Manage, correlate and share non-operational data
- Enhance network security of real-time and non-operational data
- Perform the functions of several individual devices within one device (*reduce capital expenditures*)
- Use fewer devices to wire and configure (*reduces installation costs*)
- Utilize modern substation communication solutions (*reduce engineering and commissioning costs*)
- Support reuse of legacy equipment by communicating with existing devices and adding new functions on integrated devices (*reduce capital and installation expenditures*)
- Integrate the monitoring of primary equipment at substations and the health of substation and feeder IEDs (*enhance reliability*)
- Implement an expandable scalable architecture to meet future physical and functional station requirements (*reduce life cycle costs – protect future value of investment*)

What is the GE Energy Advantage?

Communications and protocol expertise

- Large library (140) of SCADA host protocols and IED protocols
- Support for a wide range of enterprise communication solutions

Flexible and scalable automation solutions

- Flexible support of automation applications such as feeder auto-restoration, VOLT/VAR control, interlocking, load shedding
- Integrated devices incorporating functions for communications, PLC, meter, DFR, SCADA, web server

Integrated acquisition and management of non-operational data

- Automatic retrieval of digital event and power quality records
- Integrated transformer monitoring and loadability data
- Remote access using virtual connection to detailed device data

System engineering and design expertise

- Experienced at implementing complex substation and feeder automation and communications solutions



Target Markets

Generation

Electric utilities with generation, non-utility power producers and independent power producers in open or traditional electricity markets all share a common need to maintain maximum availability, avoid unplanned outages and extend the operating life of key assets. One such asset is the generation step up transformer. GE Energy has developed a comprehensive suite of transformer condition assessment models and communications applications. The system acquires key data from an array of smart sensors and provides such critical information as fault gas levels, winding hot spot, moisture in paper, bubbling risk, cooling system performance, bushing leakage current and partial discharge levels.

Transmission

Integrated utilities and operating entities of transmission assets are under increasing pressure to ensure their grids remain reliable over a wide range of operating conditions and are able to limit the spread of outages when they do occur. For example, the February 2004 NERC report "August 14, 2003: NERC Actions to Prevent and Mitigate the Impacts of Future Cascading Blackouts," included recommendations to consider automatic under-voltage load shedding in select regions. Other recommendations include regional applications of digital fault recording that is time synchronized over a wide area. GE Energy is an optimal choice for addressing the above functional additions with the capability to integrate distributed time synchronized digital fault recording, automatic load shedding and many other high value functions such as SCADA, energy metering, transformer monitoring and sequential control along with superior communications capabilities. Another example is the ability to provide dynamic transformer loading ability to the system operator.

Distribution

Distribution utilities face a major challenge to improve reliability with regulators introducing performance based rates. There are now financial incentives and penalties in place to encourage investment in the distribution network. This is where utilities have always had the most control over customer satisfaction. Now a utility's quality of service can affect their bottom line.

One important investment for a distribution utility is automation at the distribution substation. Key functions required include bus and feeder protection, SCADA, energy metering, power quality and IED communications. The ideal device integrates many of these functions while integrating data from a wide range of existing or new IEDs. The optimal distribution automation IED does not limit the utility on the type of protection relay or other IED that is used.

Feeder Automation

An extension to the automation of distribution substations is feeder automation. By acquiring data and automating responses on the feeder – the reliability of power to the end customer can be significantly improved. Example functions that GE Energy devices can provide include voltage and load measurement, feeder protection, auto-sectionalizing, auto-restoration, VOLT/VAR control, power quality monitoring and auto-restoration (in communications with other equipment) and load shedding.

Industrial Automation

Large users of electricity often own and operate the substation connecting their plant to the local power grid. Reliable and safe operation of the substation is essential for the continued profitable operation of the plant. Integrating protection, control, asset monitoring, energy metering and sequential control is required as well local and remote web browser viewing of key information. In addition communications with DCS plant control systems and historical databases such as PI is needed. GE Energy is an excellent choice for addressing industrial substation automation needs with our flexible hardware and software offerings.

