Substation Automation Systems

Project Reference
Powergrid owns India‘s first IEC 61850 substation automation system

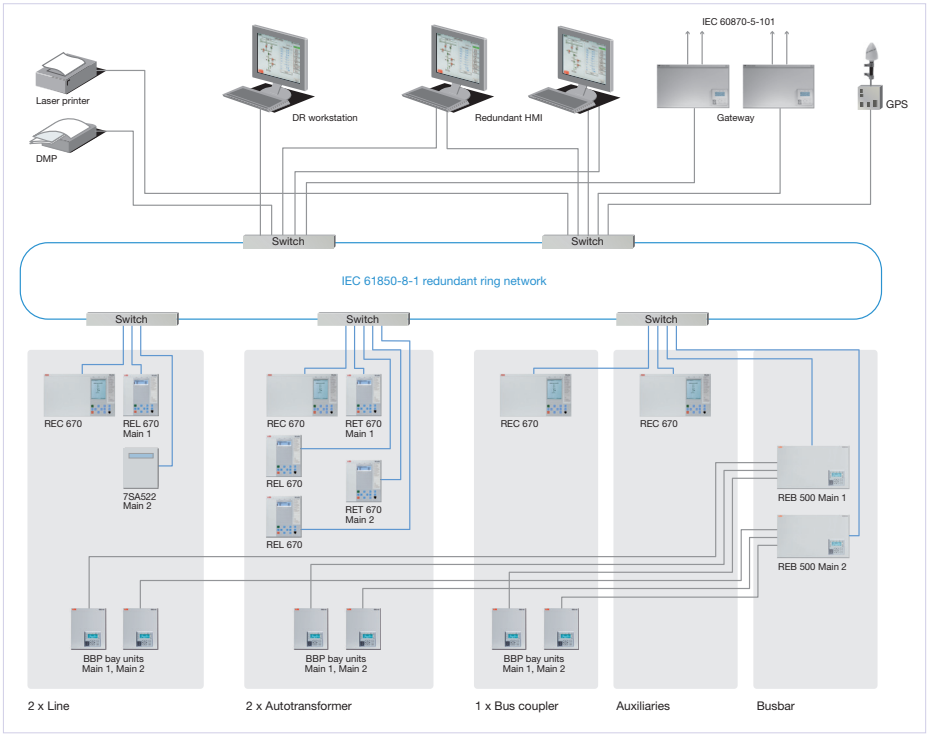
POWER GRID CORPORATION OF INDIA LTD. (POWERGRID), India’s Central Transmission Utility owns about 63,000 km of transmission lines and 107 substations with a transformation capacity of 63,000 MVA. Its best standards and practices help maintain grid availability consistently over 99 %. Per annum, about 200 billion TWh power are transmitted across the entire length and breadth of the country. The national grid operator is India’s first power utility to be accredited with ISO 9001. With its in-house expertise in all areas of transmission including 800 kV AC, 500 kV HVDC, etc., it plans to create a strong and vibrant national grid by 2012. Until then, over 60,000 km of transmission lines shall be added to evacuate an additional 100,000 MW of electrical energy.

Project

For the new Maharanibagh 400 kV GIS substation, an automation system based on the most modern technology is required. The station is located in the centre of New Delhi and supplies both commercial and residential areas. A very high system availability of 99.98 percent shall be ensured through field-proven IEDs and a redundancy concept for local operation as well as remote control and supervision from the Remote Control Centre (RCC) and Regional System Coordination Centre (RSCC) via IEC 101 protocol. Using components with verified IEC 61850 implementation as well as SCL-based tools, the vendor shall ensure a fully integrated and interoperable system that is easy to expand in the future.

ABB Solution

The solution chosen is based on ABB’s state-of-the-art IED 670 for protection and control of each bay and dual station HMIs in a hot-standby configuration. It also features redundant COM 581 communication gateways for telecontrol from the RCC at Ballabhgarh and the RSCC at New Delhi. The system’s fault-tolerant ring configuration using Ethernet switches with dual power supplies interconnects all IEDs including the 3rd party Main 2 protection IEDs, which have successfully been integrated. GOOSE messaging is used for software interlocks, auto-reclosing as well as triggering of disturbance recording. The complete substation, including the gas insulated switchgear and transformers, is supplied by ABB as a



Powergrid's SAS 690 substation automation system

turnkey package. It is the first such station to be equipped with Local Control Cubicles (LCC) that are locally engineered and manufactured by ABB India.

Customer Benefits

- Low risks ensured by efficient project management and leading-edge technology
- Enhanced life cycle management with low life cycle cost through future-proof system with IEC 61850 interoperability:
- Fully integrated SA system interoperating with 3rd party Main 2 devices
- Reuse of engineering data for extensions, up-grades and replacements
- Efficient maintenance and consistent data management with standardized documentation
- Safeguarded investment into future utility communication architecture beyond the substation
- Highest safety in control and protection
- Efficient training and support
- High-speed project execution and reliable service and commissioning afforded through strong technical know-how and global experience of ABB coupled with local competence

POWERGRID's Maharanibagh HV GIS station is not only the country's very first substation to be equipped with an IEC 61850-compliant automation system, but also features ABB India's first locally engineered and manufactured Local Control Cubicles (LCCs). Excellent coordination and cooperation between the customer's and vendor's teams resulted in a system that is optimized to POWERGRID's needs and expectations.

Customer Feedback

For its first SA-project with IEC 61850, POWERGRID sought a supplier with expertise in the standard and a thorough know-how of system integration for achieving complete interoperability. It relied on ABB, being a technology leader with strong local competence, high reliability, excellent project management and domain expertise. ABB India implemented this maiden project in the country, ensuring on-time delivery of a fully interoperable system. It also has a strong network for providing POWERGRID with immediate service and support.

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