ABB digital substation project in Taiwan

Cutting-edge ABB substation technology supporting Taiwan Power Company to fully implement the international standard IEC61850

The state-owned electric utility Taiwan Power Company (TPC) regulates electricity throughout Taiwan and its off-shore islands. TPC has developed and is implementing a multi-phase smart grid plan to improve the operational efficiency and reliability of its power infrastructure and to increase the grid’s capacity for renewable power generation interconnections.

The Taiwan Power Research Institute (TPRI) is through this digital substation pilot project evaluating the effectiveness of deploying the IEC 61850-9-2 process bus communication in order to monitor and protect the power system with a digitalized information system.

“ABB is at the forefront of digital grid technologies and delivers flexible, reliable products, systems and services to support advanced automated distribution networks,” said ABB’s Local Product Group Manager Andy Kostiono.

“We have learned a lot about process bus and station bus configurations and implementations,” said Mr Liao, Jen-Li (Jack), Leader of Power Automation Research Section of Electric Power Research Lab at Taiwan Power Research Institute. “We will be expanding the project to include the functions of transmission line differential protection, cyber security issues and time synchronization of the devices within the substation.”

TPC’s digital substation integrate measurements from conventional instrument transformers into a modern substation automation system. Analog data from the instrument transformers in the substation is converted to digital format by SAM600 merging units and transmitted as standard compliant IEC 61850 sampled values over a fiber optic Ethernet network, providing the digital interface between the substation’s high-voltage equipment and the control, protection or monitoring systems. The scope of supply for the digital substation also includes Relion 670 Intelligent Electronic Devices (IED’s) and MicroSCADA Pro system.

The SAM600 units enable electrical signals to be digitized at their source, bridging analog and digital technologies. Built for harsh environments, the units fit alongside primary equipment, collecting information close to the source in the field and converting it into IEC 61850 digital format. The advanced process bus system makes substations safer and easier to upgrade, operate and maintain over their complete lifecycle. Digital data transmission via fiber optics is more reliable and accurate than traditional copper wiring that introduces errors, especially in large substations where distances may be long.

As the SAM600 technology is IEC 61850 standard compliant it improves system interoperability by allowing to integrate IEDs from different manufacturers. The high performance of the SAM600 system enables short response times of the protection schemes, which is of key importance for Taiwan Power Company.