Substation Automation of 50MW Metro Wind Power Project

Project at a Glance

Project Type
- Substation Automation System (SAS)

Location
- Jhimpir, Pakistan

Main Products & System
- **Quantum PAC**
- **M340 Controllers**
- **Redundant SCADA servers**
- **IEC-61850, IEC-60870-5-101, IEC-60870-5-104 protocols implementation**
- **GPS clock and redundant SMP gateways**

Main Services
- Implementation of substation automation and telemetry standard protocols i.e. IEC-61850, IEC-101 and IEC-104.
- Communication architecture with multiple redundancies.
- Engineering services of the EBoP SCADA for 50MW MWPP.

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Metro Power Company Limited support the National program in reducing CO_2 emission, MPCL's Plant is recorded as one of the best CDM Project. Optimizing Energy Resources for domestic utilization and increasing added value of energy production has become new paradigm of national energy.

Realizing the National Energy needs, challenges and diversification program to Accelerate & Create Energy Business, Optimizing Domestic Energy Utilization, support the World Global Warming Program through Clean Development Mechanism (CDM) & Wind based project became MPCL's priority programs.

The Challenge

- To monitor and control the production and dispatch side on a single GUI
- To integrate all the components of the system on a same platform for ease of operators
- To provide the data on telemetry protocol i.e. **IEC-60870-5-101** and **IEC-60870-5-104** to **PLC (Power Line Carrier)** and **NPCC** Islamabad
- To maintain a 1mSec resolution for **SOE's** with time tagged

Solution
Implementation Methodology

To implement centralized **Substation Automation System (SAS) Accrescent Engineers** proposed communication network based on the mono mode fiber optic which provides the **multiple communication redundancies** for the **critical devices e.g. Protections Relays, Substation Gateways, PLC, GPS Clock and other Auxiliary System.**

- The system is responsible to fetch the data from all devices so that user can view the whole plant on single GUI
- **SAS** is also responsible to fetch data from WTG data and generates consolidated daily report for analysis
- Flexible system to integrated multiple protocols on a single platform
- Scalable implemented solution for both in hardware and software

The Solution Overview

In order to implement the trouble free **SAS**, Accrescent Engineers (Pvt.) Limited managed redundancies at in both hardware and communication which made system reliable. The main features of the implemented **SAS** are

- **Redundant Quantum controllers** for **HV & MV interlocking** backup
- **20 Nos.** of **M340** PLC for the controlling of RMUs
- Redundant substation gateways for protocols conversion and fetching disturbance record from Protection relays
- Integration of **24 #s of protection** relays on **IEC-61850** protocol
- **GPS** clock provides the time synchronization of field devices including Servers and **Protection Relays**
- Transmission of grid data to remote location on **IEC-104 protocol** using the satellite channel
- Integration of Auxiliary system e.g. **Data loggers, Fire alarm, PF compensation , EDG, Tariff Meters, etc.**

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The Benefits

- Centralized SAS system for the ease of operators
- Formation of **multiple FO rings** with **different cores** of fibers with Ring Manger
- Highly availability of **GUI** for the operators by **Redundant SCADA servers**
- **Redundant gateways** for the protocol convertors provides high availability of GRID data to **SAS SCADA** and **NPCC**
- **Quantum redundant controllers** for the **interlocking of HV & MV** in case of failure of protection relay
- Automatically generating daily report of critical data of grid and sending to authorized recipients

The Architecture
Please click on the attachment button for larger view.

System Architecture || Metro Wind Farm

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