

Substation Automation of 50MW Gul Ahmed 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 Gul Ahmed Wind Power Project.



After the increase in oil and gas prices and tremendous potential that the **Wind Corridor** in **Pakistan** presents, Wind Energy appealed as the most viable and long term solution for a country like Pakistan. Based on this, **Gul Ahmed Group**, under the Government of Pakistan's (GOP) Policy for **Development of Renewable Energy for Power Generation** 2006, applied Letter of Intent (LOI) for **1x50 MW wind power generation project**, namely **Gul Ahmed Wind Power Limited**. **Gul Ahmed Wind Farm** support the National program in reducing CO2 emission.

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 **22 #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.**

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 converters 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. 

