Digital application to monitor the industrial electrical system

ABB Ability™ System 800xA Power Control Library

Alcio Somensari, Product Manager
Agenda

- What is the electrical system?
- The concept and industrial challenges
- ABB Ability™ System 800xA Power Control Library
- MineOptimize digital application
- References
- Projects running Power Control Library
What is the electrical system?
Take control of your power with ABB Ability™ System 800xA
What is the electrical system?
Every industrial process needs energy

Electrical Control System:
- Power distribution:
  - Circuit breakers
  - Earthing switches
  - Transformers
  - Generators
- Power consumers:
  - Low/medium voltage motors
What is the electrical system?

Power automation overview

Power Automation

Grid connection

Power Generation

HV

Generator

MV

Transformer

LV

Protection & Control IEDs

LV/MV Motor

½ Process: interlocks, logics

¾ Electrical: energy consumption, maintenance
Challenges
Solve the motor issue
Challenges
Assure safety for maintenance personnel
Challenges

Typical electrical SCADA

- Wrong Parameterization. 3rd trip within a month: recurrent problem
- HV subst. 34.5 kV
- MV subst.

- Spring charger mechanism

- 5h repair
- 4h ramp-up
- 5km
- 4.5km
Digital substations
Going digital with the Power Control Library

- HV subst.
- MV subst.
- Remote parameterization

34.5 kV

0.5h repair
4h ramp-up

Spring: 2h repair + 0h ramp-up (no production stop) = $$\$\$$
All Electric Mine
Take control of the entire electrical system

Mining Equipment

Motors running in most of mining equipment
• Energy availability is essential to keep the plant running besides the minerals processing
• Bucket-wheel excavator, shovel, among others
**All Electric Mine**

Take control of the entire electrical system

**Electric Vehicles**

Higher demand of energy supervision due to increased energy consumption

- Battery Electric Vehicles (BEV) going all electric require battery levels monitoring and the availability of fast chargers
- New e-houses for overhead lines (catenary)

Boliden e-trolley at Aitik (pilot and demonstration project)
ABB Ability™ System 800xA Power Control Library
A digital application to monitor the industrial electrical system
ABB Ability™ System 800xA Power Control Library

MineOptimize digital application for Power Automation
ABB Ability™ System 800xA Power Control Library
Enhancing the visibility of your substations

Customer Needs

Your challenges:
- Reduce capital investment and operational expenditures
- Increase availability of the energy supply to the process
- Safety for staff
- Achieve high-standard system for energy efficiency support

Our Solution

Provide faster troubleshooting remotely and safely away from electrical substation through an enhanced substation control and monitoring environment from the control room
- Connect substations
- Remove maintenance team from electrical substation
- Turning data into potential

Safe Management
Remote Live Supervision
Costs Saving
ABB Ability™ System 800xA Power Control Library
Optimized engineering going digital

- Digital protocols
  - IEC 61850: status, commands, measurements
- Standardized Engineering
  - Typical philosophy for IED programming optimizes system configuration, test procedures while also reducing errors
Bay-typical approach
Reduced project schedule and costs
• Bay-typical philosophy reducing engineering efforts for software development for ABB or 3rd party IEDs
• Ergonomic graphics: status, interlocks, measurements and phasor diagrams
• Focuses on less risk during software development
• Flexible configuration to several switchgear types (e.g. incomer, feeder, bus coupler, etc.)
ABB Ability™ System 800xA Power Control Library

Faster troubleshooting through remote problem solving

- Electrical interlocks & protections on faceplates
  - Same information about interlocks and protection locally and remotely, in a synthesized manner
- Alarm list based on sequence of events
  - Easier understanding of cause/effect after an electrical fault
- Online documentation access
  - Single line diagrams, logic diagrams, technical manuals a right-click away: Maintenance team gets to the faulty place with the right information in hands

Reduced OPEX
ABB Ability™ System 800xA Power Control Library

Improved safety with remote problem solving

- IED logic configuration and parametrization
  - Shortcut to logic and parameterization software a right click away, allowing fast access, saving time
- Access to disturbance record files
  - No need to go to the substation to upload or view files, allowing faster and safer fault analysis

Reduced OPEX
References
Projects running the Power Control Library
ABB Ability™ System 800xA Power Control Library

Application growth

- Mining & Minerals (22 projects)
- Cement (6)
- Pulp & Paper (1)
- Water and treatment (1)
- Oil and Gas (2)

IED vendors
- ABB (> 2500)
- Siemens (> 160)
- Schneider (> 100)
- SEL (> 300)
- Others

> 3500 IEDs in > 30 projects worldwide