The Power of One System - the Benefits of Integrated Process and Power Automation

For those who feel that they have optimized just about everything they can, there remain real opportunities for improvement in process manufacturing facilities. Integrating the electrical equipment in a plant to the process automation systems is the next frontier in delivering productivity improvements.

Industry is the number one consumer of power, consuming roughly 1/3 of the energy used in the US. The creation of a unified environment to monitor and control the process and the electrical systems that provide the energy as a raw material to the process allows operations to make decisions based on dollars and cents as opposed to being limited to temperatures and voltages.

Process manufacturers in different industries have varying priorities and objectives. An oil and gas producer with an unstable energy supply strives to keep his process running through the use of load shedding applications during power interruptions. Pulp and Paper, Metals, and Power Generation facilities need to manage power consumption as a raw material cost. One thing is certain - all facilities can benefit from the use of added intelligence available from today’s electrical devices to reduce maintenance costs and improve energy efficiency.

So with all these benefits, why isn’t everyone doing this today?

In most cases, automation and electrical systems are totally separate entities. Those who have attempted to interface electrical equipment to their automation systems have been challenged with engineering and maintaining a multiplicity of protocols, duplication of hardwired signals, and complicated mapping of information from the devices. This leads to increased project execution cost and risk, long commissioning cycles, finger-pointing, and difficult and expensive lifecycle support. In addition, organizational barriers exist between the automation and electrical disciplines at process manufacturers as well as engineering firms and suppliers.

Many of the technical challenges have been addressed with the emergence of new technologies and standards for the integration of intelligent devices on the plant floor. One such technology standard for integration and cross communication of intelligent electrical devices is IEC 61850. This standard, created by both ANSI and IEC, provides for an Ethernet-based communication protocol and data model for electrical devices, equivalent in scope to Foundation Fieldbus for process instrumentation and control valves. It also allows for peer-to-peer communication between the electrical devices. ABB has extended the IEC
IEC 61850 standard to integrate intelligent electrical devices to process automation systems; we have deployed IEC 61850 technology in more than 600 substation, power management, and automation projects already worldwide.

This new approach significantly reduces project execution costs by reducing the amount of engineering related to wiring, data and signal mapping, and protocol implementation and troubleshooting due to the standardized data model. It also reduces commissioning costs due to reduced hardwired signals and I/O and cabinetry requirements through implementation of a standard digital network infrastructure. Experience shows nominal cost savings of 20% during project execution and commissioning. The ability to eliminate duplicated hardwired signals and reduce the number of protocols also allows for decreased lifecycle support complexity and costs.

By significantly reducing the technology hurdles of the past for integrating intelligent electrical devices to automation systems, process plant owners have the opportunity to create a unified environment to manage the entire plant floor. Integration of process and power automation systems provides a single point for ERP access, a centralized data historian, common alarm and event lists, in addition to one operational view of the process. The potential returns from a unified view to the process and power automation systems include:

- Reduced engineering and commissioning time for integrated projects
- Reduced investment and operational costs through reduction of duplicate equipment, more effective deployment of staff, and lower training costs
- Increased productivity and decreased downtime by quickly identifying and reacting to degradation that may lead to process upsets
- Optimal results from maintenance activities through deployment of condition based asset monitors for all electrical and process control intelligent devices in a facility via one common system to manage all plant assets
- Reduced energy costs through better insight to the process areas and equipment that drive energy consumption and implementation of power management applications

This functionality was demonstrated to our customers at the ABB Automation & Power World customer event earlier this year and was embraced with great enthusiasm. ABB is engaged with our customers on a growing number of these projects in Mining, Pulp and Paper, Petrochemicals, Oil and Gas, and Power Generation around the world. Our customers have recognized the potential that integration of process and power automation systems can bring by addressing social, economic, and environmental goals for their companies.

The conclusion – the future is here, when will you get on-board for greater productivity and energy efficiency in your facility?