Industrial IT Solutions for the Utility Industries

Raising enterprise intelligence to the power of IT

ABB Automation
That's the value equation behind today's ABB. Backed by nearly 150 years in electricity and water generation, transmission and distribution, ABB is a driving force within the evolving Utility Industries. We anticipate our customers' needs because we understand your business. In power generation. Across the electrical grid. Throughout the water network. From source to consumption. ABB can help you to operate more efficiently, profitably and competitively with our Industrial IT solutions for the Utility Industries.

**Industrial IT:**
the next way of Thinking for the Utility Industries

All utility operations face changes driven by shifts or growth in demand, new environmental pressures, and the impact of the global economy on fuel and infrastructure. Some also face the effects of deregulation or privatization. We have the experience, solutions and know-how of your mission critical business processes to help you succeed under changing market conditions.

ABB is focusing our development efforts on software and hardware solutions – collectively called Industrial IT – that will optimize customer operations and maximize return on investment. Industrial IT links your automation systems, seamlessly, with your information systems. The end result: a new ability to harness real-time data across your entire enterprise, giving you the tools to optimize assets, heighten decision support and improve efficiency.

**Real-time Information**

Imagine that the load varies from the forecast. Here's the good news: you know your enterprise's generation capability, minute by minute, based on actual plant status. That means you know exactly which plants can respond on time to answer the dispatching need. Your generating plants receive detailed implementation plans in their control system, and supply is automatically coordinated with the rest of the grid. In a deregulated market, your systems will also recommend and implement the bidding strategy to best take advantage of your known capabilities.

Realistic responses to market opportunities – minute by minute. That's what ABB calls eproductivity tools. The ability to make swifter, better informed decisions across the entire enterprise. That's the power of Industrial IT for the Utility Industries.

**Need for Standardization**

Like many organizations, ABB has discovered that responding quickly and efficiently in the new economy requires a standardization of enterprise processes. Imagine your entire work force has all the tools and information it needs right at their fingertips. As a result, your entity becomes an industry leader because it can respond quickly and reliably to the distribution needs of individual customers. Congratulations, you've standardized processes. Along the way, you developed a powerful database of reusable global solutions, allowing employees to implement projects and react to market conditions from a position of greater speed, knowledge and strength. Get ready to capitalize on your new-found flexibility and to realize better efficiency and economy of scale. That's the power of Industrial IT for the Utility Industries.
Asset Optimization
Imagine environmental pressures that virtually prohibit adding capacity to the grid. Your saving grace: existing substations that communicate status in real-time, therefore improving data flow and data accuracy and enabling you to maximize assets. Resulting maintenance cost reductions, incremental improvements and stronger grid management all combine to give you the increased capacity you previously thought impossible. Furthermore, you pick up a new market by providing broadband communication services to the telecom market. It's possible because Industrial IT provides analysis of asset information – from substation measurement to the grid – with just a few clicks of the mouse. That's the power of Industrial IT for the Utility Industries.

Integrated Solutions
Imagine linking up with a strategic partner who can provide robust Industrial IT solutions, including instrumentation, switchgear, control, protection, performance optimization, and operational management systems. Your partner is compensated as you reach strategic business and environmental objectives. They even finance the program so impact to your balance sheet is zero. Smart customers are discovering that this is the way to optimize Industrial IT performance and minimize costs with ABB. That's the power of Industrial IT for the Utility Industries.

Delivery Today
Beyond imagination? We don't think so. ABB spends nearly $2.5 US Billion annually on research and development. This has enabled us to develop the broadest range of products and solutions. Over 50,000 ABB employees serve the Utility Industries, affirming our ability to deliver 365 days a year. ABB is firmly committed to our utility customers and is serious about creating long-term partnerships with them.

Profit from ABB’s Experience
Maybe you’re a power generator, a power transmitter, or a power exchange. Then again, you might be an independent system operator, a power distributor, or an energy service provider. Even still, you could be a water utility, district heating provider, municipality, or multi-utility. Whatever the case may be, ABB has probably wielded our expertise somewhere in the world to help a customer who’s already faced your situation.

Continue with us as we next examine four scenarios, each demonstrating how Industrial IT will play a key role in meeting marketplace challenges now and in the future.
ABB’s Industrial IT solutions give you a leading edge

Advanced technology to meet new market demands

Today, utilities can live or die by tight margins. Millions of dollars annually are staked on assets, technologies and processes that may – or may not – deliver an advantage on performance, responsiveness, service, or shareholder value.

Much of the lifetime return on your investment is determined when you break ground on a new project. Today, service is an integral part of the production phase and must be well planned and optimized at the beginning of the design phase. Modern production processes will be interrupted if they rely on emergency on-call service. This is why continuous on-site or on-line service is a requirement and has to be considered during all phases of the project. ABB can help by providing consultation and training during the project as well as the start-up phase.

Protect your investment. Bring ABB into the equation and benefit from the widest range of products, solutions and experience available anywhere in the world.

Get a new asset off to the best start with:

- Complete infrastructure design
- An automation design integrated with design of the new operation
- Highly tuned solutions based on the know-how of the most experienced supplier to the Utility Industries
- Design participation

Increasing performance

ABB gives you effective strategies for maximizing new asset profitability:

- Asset management to improve performance
- Planning, load forecasting, bidding, and scheduling to optimize available resources
- Network management systems for wide-area measurement and control needs
- Software for management of electrical power systems, energy and distribution management

Reducing delivery times

Through standardized processes, ABB engineering efforts can be integrated with those of the main contractor to eliminate rework and reduce waste activities. The customer benefits from:

- Shortened delivery time
- Consistent design implementation
- Decreased total cost of ownership
Maximizing efficiency
ABB helps you utilize every resource to obtain and sustain the greatest efficiency:
• Instrumentation
• Meters and automated meter reading
• Electrical switchgear
• Safety and protection
• Advanced control center technologies
• Asset optimization
• Energy management trading systems

Reducing uncertainty
ABB replaces risk with proven solutions:
• Precise system performance simulation for proposed systems
• Ability to implement project completion with performance guarantees
• Proven supplier
• Ease of maintenance

Securing financing
ABB has developed a range of traditional and innovative business models to secure funding:
• Financial advisory services
• Debt financing
• Equity Partnerships
• Export credit financing
Industrial IT can help keep you competitive and profitable

Who says you can’t optimize existing assets under rising constraints?

Just because resources are limited doesn’t mean choices are. ABB offers alternatives. Through consulting and outsourcing, a utility operation can continue to improve performance on a stringent budget. ABB enables management to meet their goals on limited resources.

Incremental solutions to optimize performance

Partner with ABB to choose the improvements you need today:

• Optimize a key transformer by capturing real-time data off a critical network node
• Improve information for substation operation and maintenance via intelligent electronic devices and stronger communication systems
• Improve operations with modern control rooms that enable you to streamline staff
• Achieve combustion optimization for lower fuel cost and high ash value while meeting new environmental standards

Consulting services

As time goes on, the pressure to stay competitive is increasing for all key performance factors. Service that was defined and selected during the design phase will not stand the test of time. To meet new requirements, the demand for highly accurate data and real-time information has never been so great. ABB’s service consultants can help you answer the increasing demands for the best quality:

• Process data
• Plant documentation
• Control data
• Process analysis

ABB augments lean staff with consultants who can deliver well-proven solutions in maintenance, operations, and optimization:

• Availability and lifecycle maintenance
• Asset management with guaranteed returns
• Facilities management
• Task and skill outsourcing
• Engineering solutions with performance guarantees
• Plant and infrastructure modernization and upgrades
Thinking outside the box
ABB consultants can help you design a business plan that will squeeze new revenue from your existing assets. For example, we’ll show you how to offer broadband communications services on your existing network infrastructure. Or, we’ll help you realize greater profitability and efficiency by combining asset usage:

- Generation and desalinization
- Heating
- Waste removal

Can you envision a dam that will use Industrial IT to balance generation, water production, irrigation, and flood control? ABB can. Thinking outside the box is how we help customers achieve higher capacity and greater profit with less resources.

Financing
ABB enables plants to expand capabilities and markets:

- Asset management to make the most of your existing automation investment
- Financing options for purchases and leases
- Performance-based financing

ABB helps you meet heavy demands on limited resources.
Industrial IT accelerates the transition to success

Developing new processes and prospects in a new role

When deregulation or privatization occurs, a utility operation faces stark economic imperatives. New players are born from the old. Each can specialize, migrate to a new strategy, combine with other new players, or even shut down. The transition will alter every aspect, from fuel to meter/source to meter; from people to processes, from markets to customers. While the roles are new, the assets are the same. Again and again, Industrial IT has proven to be the fastest way for transforming existing assets into new roles.

Charting the right course

ABB helps your operation, plant, or network to maximize potential so you can serve the most promising processes, markets, and customers:

- “Blue collar consultants” with experience helping other enterprises in transition
- Evaluation of mission critical processes and changes that are needed
- Development of a strategy for deploying Industrial IT to accelerate process improvements

Reinventing and reoptimizing utility operations

ABB helps you re-engineer your operations with:

- Consulting services to evaluate options
- Solutions scaled to produce only the desired improvements
- Performance optimization strategies that use existing or new equipment
- Dynamic change controls to maximize flexibility and efficiency
- Asset management to maintain peak operability
- Energy management systems to maximize total operations efficiency for power generators and electrical grids, as well as to guide bidding strategies
- Water management systems to maximize efficiency in water generation and distribution

Getting closer to a changing customer base

Resources that improve responsiveness to even the most discriminate customers include:

- Customer relationship management to improve flexibility and responsiveness
- Distribution solutions to improve efficiency and maximize service levels
Replacing many vendors with a single partner
ABB allows you to replace the inefficiency and uncertainty of multiple suppliers with a single source:

- Elimination of overlapping engineering and procurement processes
- Performance-based financing in which ABB takes measurable customer objectives as its own, basing payments on achievement of these objectives over time
- Outsourced staffing so you can concentrate on your core competencies
- Common computing platform
- Open standard communications to third-party systems

New financing alternatives
ABB can provide financing to lighten your balance sheet, increase shareholder value and enable management to win new markets:

- Direct financing
- Leasing plans
- Partner interests
- Performance-based financing
Strategic Scenario

Continued Requirements for Stable & Reliable Supply
Demand for Reduced Risk of Serious Events
Aging Assets
Environmental Pressures from Regulators & Customers

Industrial IT helps you maintain reliability

Security versus uncertainty
One is paramount to your enterprise while the other is undeniably dangerous. Success depends on minimizing the risk of widespread or lengthy service interruptions. Safe operation is a must to preserve assets, as well as human life. ABB can help you to understand and reduce risks with:

• Boiler and turbine safety systems based on deep process understanding and intelligent control strategies
• Interactive plant and substation automation for precise monitoring, analysis and control of equipment and reliable protection of transmission and distribution
• Substation automation for fault analysis, restoration and real-time switching
• Management systems for outage management, operational planning and optimization of distribution
• Distribution automation systems for fault localization and feeder automation

Balancing customer demands with environmental pressures
New plants and networks must approach zero environmental impact, while existing operations must meet requirements never envisaged during their design. It’s a real challenge to meet load demands for changing economies, to maintain profits and to stay environmentally compliant. ABB provides solutions for sustaining reliability while protecting the environment at the same time.

We can even help you maximize returns on your environmental programs:

• Asset optimization to reduce environmental impact while increasing efficiency
• Innovative product design that reduces space consumption, preserves the landscape and has less visual impact on the environment
• New measurements of process variables to guide optimization and eliminate upsets that often cause pollution
• Historical data archiving
• Environmental credits marketing and management
• Reporting and compliance solutions and services

Advanced technology for greater reliability
ABB set the standard for high voltage protection. In fact, we created the algorithms. Since then, we’ve continued to set the pace for reliable delivery of customer assets:

• Integration of complete solutions for substation protection, monitoring and control
• Development of intelligent electronic devices for substation protection and control, resulting in better information for higher performance and higher availability while freeing up manpower
• Proven redundancy of communications networks
• Integrated, higher capacity communications networks to ensure optimal control of the power system
• Communications systems to automate existing distribution networks for higher efficiency
A genius for incremental improvement

ABB can make just the needed changes to your safety and control systems, with minimum downtime to your operation:

- Phased implementation of Industrial IT solutions during planned maintenance stops, scheduled over a period of years
- Solutions for today’s requirements that fit with existing assets and future plans
- A range of support solutions to ensure optimum operation throughout a new program
- Reliability chain audits
- Remote service centers that provide continuous monitoring and help create reliability recovery programs
- The ability to finance a comprehensive program, with repayment from benefits as they are realized

ABB helps to quickly restore service.
ABB is your Total Solutions Provider, from Generating Site to Consumer...

Market Outlook
New customer demands, technologies, processes, and players. While each may alter the utility landscape, all utility enterprises continue to face certain realities:

• they must match supply with demand in a complex network covering large regions
• they have faced, or will face, privatization or deregulation with resulting dramatic changes in market and shareholder demands
• they must utilize distribution systems that are capable of reaching every residential and industrial user
• they must deliver with 100% reliability, 24 hours a day without fail. History has proven that outages can be so risky that they threaten the very fabric of society

ABB understands your evolving needs. By building partnerships and strategic alliances with our utility customers, we offer the global experience and expertise to improve not only plant availability, efficiency and asset optimization, but also to improve the business processes that drive your entire enterprise.

One Stop Shopping
ABB offers one stop shopping for Industrial IT solutions. Partners who complete the scope of supply, like those who provide geographic information or customer information systems, support our solutions.

To enhance customers’ sales growth, ABB provides tailored financing solutions as well as consulting services. Through our Financial Services segment, we have established a proven track record in financing large infrastructure projects, especially in power generation. To date, ABB has closed financing for customers in Germany, the United States, Mexico, Australia, India, and the Ivory Coast.

For added flexibility, ABB offers customer leasing programs and performance-based financing options. The leasing program helps meet the needs of customers who are pursuing smaller projects and orders, while performance-based lending provides capital to customers who, in turn, use the money to install energy efficient equipment or generation equipment in their facilities. The money generated through savings on energy costs or revenues from increased capacity is used to repay ABB.
**Power Plant Automation**
- Distributed control systems for power plants
- Plant optimization systems
- Gas turbine control systems
- Steam turbine control systems
- Boiler control systems
- Vibration and condition monitoring
- Hydraulic control systems
- Flame scanners
- Safety and protection systems
- Control room design
- Online carbon and ash monitoring
- Online combustion optimization solutions
- Power plant training simulators
- Power plant automation services
- Instrumentation
- Electrical equipment
- Field equipment

**Network Management Systems**
- Control and Data Acquisition
  - Supervision, remote control, data acquisition
- Utility Data Warehouse
  - Historical information storage

**Communications**
- Applications
  - Power system control
  - Power line protection
  - Operational telephone services
- (Network) Management
  - Planning
  - Optimization
  - Control
  - Production follow-up
- Energy Management
  - Planning
  - Optimization
  - Control
  - Transmission follow-up
- Distribution Management
  - Control room management
  - Outage management
  - Operational planning
  - Distribution optimization
- Distribution Automation
  - Fault localization
  - Feeder automation

**Substation Automation**
- Control, monitoring and protection for generation, transmission and distribution
- Instrumentation and control
- Transformation
- Automation
- Fault analysis and restoration
- Real-time switching

**Water Applications**
- Complete plant networks
- Control systems
- Application Software
- Complete process control centers
- Integration of plant automation systems into customer's intranet

**Execution Systems**
- Energy optimization
- Water use prognosis
- Online simulation
- Maintenance management systems
- Operator aid systems

**Reporting Systems**
- Long-term archiving
- Trend and statistic presentations
- Laboratory inputs
- Government reports
- Rain statistics

**Remote Network Systems**
- Remote alarms and access
- WAN-based supply/discharge systems

**Service**
- Operation
  - Emergency service 24 x 365
  - Help desk
  - Spare parts and logistic service

**ABB’s Industrial IT Solutions for Utility Industries**
In North America: Information and Energy Management Systems Support Mexico

“For the first time ever, I can see system demand in real-time!” This is the testimonial of Gustavo Salvador, a systems operations manager at Mexico’s Comisión Federal de Electricidad (CFE). Facing a rapidly growing demand for energy, CFE elected to modernize the control systems for its entire electrical network. ABB Network Management was charged with implementing a massive information and energy-management system for control and administration of the country’s electrical network. The project resulted in the largest totally integrated, multi-tiered electric network control system in the world.

The hierarchical system incorporates a full suite of network and generation control applications, as well as a powerful information storage and retrieval system.

In North America: ABB Financing Funds Boston University Plant

ABB’s Financial Services group has funded a $6 million performance-based project for Boston University, the third largest private university in the United States. ABB’s customer, the developer, will install a central plant to provide the heating and cooling for a new, state-of-the-art dormitory building and other campus buildings. The plant will generate steam and chilled water that the developer will sell to the university. The developer will then use a share of the proceeds to repay the loan to ABB.

In Europe: Control Technology Reduces Environmental Impact

The environment was a major concern when a Welsh coal-fired power station was revived in April 2000 after five years of non-service. With the help of ABB control technology, the impact on the environment is being reduced at the Fifoots Point power station near Newport, Wales. The station is using an ABB open control system to provide boiler control, burner management and environmental systems to control the flue gas desulphurization plant. The enhancements to the boilers, along with changes to the turbines and generators, have raised the combined maximum output of the three units from 360 MW to 393 MW. “We estimate there is at least 15 years life left in the station,” said Mike Wheeler, a team leader at Fifoots Point.

In Europe: Wastewater Treatment Solution Improves Performance in Germany

The city-owned Städtischer Abwasserbetrieb Magdeburg wastewater treatment plant in Gerwisch, Germany exemplifies asset optimization and improved performance through online simulation. The plant purifies sewage for roughly 300,000 citizens. However, industrial discharges boost the entire capacity to 400,000 customers. ABB’s delivery of complete electrical and automation equipment was highlighted by an open control system that employs a leading third-party online simulation software system designed specifically for sewage plants. Customer benefits include operational savings in energy and reagents, enhanced operator assistance, an early warning system, and improved process knowledge.

In Europe: Service Helps German Chemical Plant Improve Network Control Functionality

When a German chemical plant had ABB integrate a network control solution into their existing system, their major request was that all activities be implemented without interruption to their 24-hour operation. Cooperation between the customer and ABB’s Service group improved functionality and reduced maintenance costs for the plant’s network control system, which monitors and controls electrical supply. Other customer benefits included the achievement of Y2K compliance, improved functionality for remote data collection, accumulated value handling and more.

In Europe: Göteborg Energi Powers up with a Complete Industrial IT Partnership

ABB’s “blue collar consultants” joined Sweden’s Göteborg Energi to develop an IT strategy for this electric, gas, and heating multi-utility. The results included real-time data flow among new and integrated solutions for operational planning and follow-up, an asset management suite, optimization of production and delivery, metering information, customer information, geographical information, trading information, management decision systems, and integration with the billing and accounting systems. We are now implementing the move to tomorrow’s distribution system with real-time outage information, condition based maintenance, modernization, and upgrades.
Other current projects include: enhancement of energy metering administration, development of web services for Göteborg Energi’s customers, and tools for network calculation and optimization.

In India: Complete Telecommunications System Helps Keep the Oil Flowing
IndianOil is a vital distributor of crude/petroleum products throughout India. The company was in need of a turn-key solutions provider for an integrated SCADA, station control center and telecommunications system for its Viramgam-Chaksu-Panipat crude oil pipeline project. They were looking for the right expertise to integrate the new systems with the telecommunications digitization of the existing Salaya-Mathura pipeline.

The integration of the existing third-party equipment with the new ABB communication system was a challenging task for ABB’s engineers because it required a thorough knowledge of both. ABB’s implementation of the system has given IndianOil engineers confidence to plan future communication projects involving the modernization of the existing infrastructure and integration of different technologies.

In the Middle East: Stepwise Modernization Improves Availability and Maintenance
ABB’s experience in providing service solutions without interrupting customer uptime is one of our strengths. During regularly scheduled outages, ABB modernized the control for gas turbines and exhaust-heat recovery boilers, including electrical equipment and plant process systems, for our customer. By modernizing the equipment, ABB delivered an integrated system with overall communications and data acquisition that will enable the customer to realize improved availability, operator information and maintenance guidance.

In Asia: ABB Boosts Reliability for CLP Power in Hong Kong
Providing electricity to nearly two million customers, CLP Power in Hong Kong had a history of long outage times, which made it difficult to obtain accurate data and timely information. The grid also lacked remote switching facilities. ABB faced many challenges as we began to implement our distribution management system. The large system size, voluminous data engineering work, rapid technology changes, staff development needs, and software customization all were addressed in the solution. ABB’s success in this project will help CLP to become a world leader in electrical distribution.

In Asia: ABB Provides Countrywide Telecommunications in Vietnam
The Vietnam power utility exemplifies ABB’s know-how in integrating older facilities into new technology. The utility decided to update their existing communications network – using the latest telecommunications technology – in order to integrate further substations. The goal of the project was to improve distribution power, to reach a high degree of investment protection and to achieve increased efficiency and customer satisfaction. The communications network supplied by ABB includes an SDH backbone, PDH access multiplexers, telephone exchanges, and PLC links for teleprotection. This particular customer chose ABB for our experience in providing turn-key solutions to power utilities all over the world.

In Australia: Intelligent Substation Automation for 275 kV Plug and Switch System
When Powerlink needed to upgrade its substation in central Queensland, Australia, its goals were higher availability and lower costs for investment, operation and maintenance. Powerlink’s major requirement involved very long transmission distances of roughly 1700 km, due to the concentration of its customers in the southern portion of the state. ABB applied its advanced substation technology, featuring hybrid switchgear type PASS (Plug and Switch System) with integrated state-of-the-art sensors and actuators that exchange data via serial fiber optic links.

The compatible intelligent substation automation system has numerical control and protection units that process sensor inputs and actuator outputs via serial fiber optic links, support local and remote control, perform continuous monitoring of the complete system, and provide flexible remote access to all data.