

# Serving the Oil Refining and Downstream Industries

ABB provides products, solutions and services that enhance the productivity and energy efficiency of oil refineries, terminals and downstream complexes.





## Global Technologies

responsibility

ABB is a truly global organization with global resources. With a firm focus on health, safety, security and the environment, we strive to provide the process industries with technology and services that have a positive effect on the world we live in. With significant application knowledge developed over many years we can improve your productivity and reduce the environmental impact.



## Multiscope

risk management

ABB provides a wide portfolio of products and services for oil refineries / heavy oil conversion and associated downstream processes either directly to the end user or via engineering contractors. In many cases ABB will act as the Main Automation Contractor (MAC) or Main Electrical Contractor (MEC), taking responsibility for the integration of the composite solution to reduce client risks, project delivery time and to optimize the operational benefit of the installed system.



## Lifecycle

enhanced return on capital

ABB's services and products enhance your project from first concept to decommissioning. We operate locally while drawing support from ABB resources around the globe. A partnership with ABB provides world class expertise and continuity. As the project develops from one phase to the next, we're able to capture Lost Profit Opportunities (LPO) that would otherwise be missed.



## Enabling Technologies

operational profitability

Our Industrial<sup>IT</sup> enabling technologies provide fully integrated power, automation and safety solutions with open interconnectivity to business systems. We offer a single system solution safely providing integrated automation, electrical, power management and telecom aspects that also supports all major fieldbus technologies.



## A Pioneering Spirit

People and systems that support the complete manufacturing process



*Safety, risk management, operational excellence and sustainability are important to our customers and to us. The ABB portfolio of products and engineering expertise can reduce risk, reduce cost and help you maintain a competitive edge.*

ABB is a leading supplier of instrumentation, analytical devices, automation, electrical and safety systems to oil refineries from Jetty management through process units to oil movement and storage, blending and distribution. From single products, supplied direct or via channel partners, to complete composite solutions demanding excellence in project management and deep process application knowledge, we can tailor the delivery scope to meet your requirements. In some cases you may choose to use ABB's consultancy services to supplement your own staff, in other cases you may choose to have us act as the Main Automation / Electrical Contractor (MAC / MEC). ABB has considerable experience in the MAC/MEC role for global projects and can take total responsibility for the management of the automation and electrical design, selection, manufacture, installation, commissioning and post-commissioning support. By assigning ABB as the MAC/MEC early in a project ABB will determine engineering requirements, optimize the scope definition and therefore reduce both CAPEX and OPEX costs.

Where there are multiple contractors (EPCs) supplying different process units, ABB will perform the interface management function to ensure a consistent, compatible solution. This eliminates the need for the client or project management contractor to coordinate and pass this information between many different parties.

In order to help oil refineries achieve a competitive edge, ABB now offers extended automation. This incorporates, in a fully redundant integrated platform, manufacturing management, safety management, process and electrical control, and asset management to provide all your plant personnel with up-to-date information relative to their job role using the ABB Aspect Object™ technology.

Combined with total lifecycle services and evolution policy our integrated solutions and consultant services improve your Return on Capital Employed (ROCE) – making ABB an ideal partner throughout the lifetime of your refinery for optimization of the assets.

## Reducing your costs and risks

- Bi-directional integration with Intergraph's SmartPlant Instrumentation and Electrical – SPI / SPEL (INTools™) reduces total engineering costs by around 25%
- Utilization of ABB as an MAC / MEC reduces CAPEX costs by around 20%
- ABB's Advanced Process Control reduces OPEX costs by 3% to 9%
- 800xA is both MUSIC and Wurltech certified for cyber security
- ABB's Total Plant Reliability™ improvements return 3 to 1 on investment

*Integrated control and safety systems with asset management provides Critical Condition Management that can add 5% to profits.*

Source: ARC



# A Multiscope Lifecycle Supplier

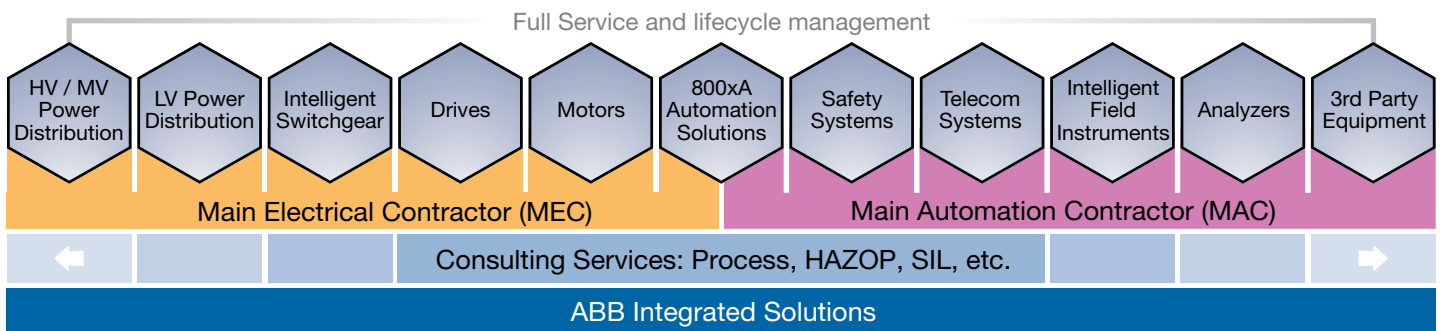


As a leader in automation and power technologies with global engineering capability and a wide portfolio of products and services, ABB meets the special demands of the process industries. By involving ABB at the concept and FEED stages of a project, we can assist you in identifying best in class solutions that leverage the use of newer technologies and reusable components.

We recognize that automation systems are key to your company's long term viability and therefore support the use of framework agreements to cover a wide scope of product supply and associated services. These can cover multiple sites and form the basis for a corporate alliance agreement.

Throughout the lifecycle of your facilities, we are uniquely positioned to support your changing requirements giving you the flexibility to match your needs with our capabilities, from routine maintenance and remote monitoring to performance services.

We deliver multiscope projects with the objective of meeting your goal to reduce total installed cost and total cost of ownership. On refineries with multiple EPC involvement, ABB works with the end user to create a common Functional Design Specification (cFDS) for the supply of ABB and non-ABB scope to provide commonality, reduce risk and costs by reuse of proven solutions.



# Multiscope Competence

From minor upgrades  
to new grass root refineries



*Our professional project management, global presence and strict compliance with international industry standards ensure timely, high quality deliveries throughout all project phases, from concept to operation – with a firm focus on health, safety, security and environment.*

We execute projects around the globe, with local content and support to ensure knowledge transfer. The combination of global execution and local involvement improves productivity in even the most remote locations.

ABB contributes to lasting improvements across the project's lifecycle by bringing special expertise to the integrated engineering team, including multi-discipline experience and in-depth product and system integration knowledge.

Our focus on system migration paths allows us to upgrade existing installations to state-of-the-art solutions without production stops. ABB has specific services and evolution products to allow upgrades and hot cut changeover of existing systems be they ABB or non-ABB.

ABB's analytical technology, advanced process control services, Overall Equipment Effectiveness (OEE) calculation tools, and inferential modelling build solutions to increase revenue and lower operational costs.

Once installed, ABB engineers will look to support you in process optimization, best use of assets, maintenance of the safety SIL rating plus routine servicing of the ABB and non-ABB equipment.

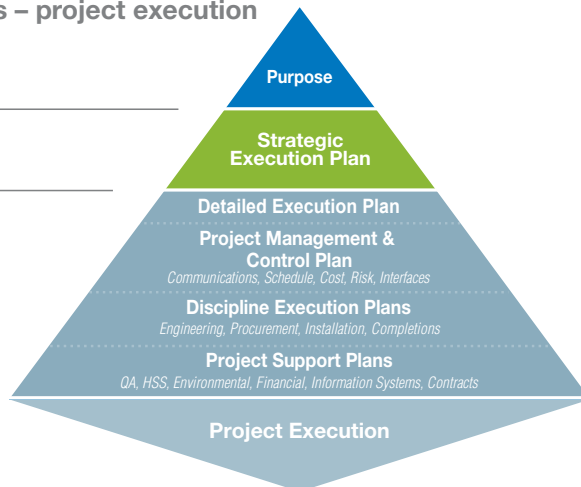
## Composite solutions – project execution

- Project Requirements
- Project Goals & Objectives
- Key Performance Criteria

- Overall Execution Strategy
- Discipline Strategies
- Success Criteria

- Detailed Methodologies
- Tools and Procedures
- Detailed Schedule
- Resource Requirements

- Implementation
- Monitoring
- Trends Analysis
- Performance Measurement



## Risk management

ABB manage large projects effectively – we provide large-scale capabilities in terms of administration, engineering, documentation, testing and handling logistics of multi-discipline packages.

Use ABB's consultancy and engineering services which have decades of experience in process, automation and safety systems to reduce costs and maintain regulatory compliance.

Likewise, the use of Industrial IT enabled type tested products from ABB and third-parties, along with control libraries, reduces risk, eliminates potential project delays and improves operator visibility of assets.

As a MAC / MEC, ABB takes responsibility for the interfacing of its and third party equipment, reducing risks during pre-commissioning.

*Extensive lifecycle services complement our multiscope solutions to provide world-class asset integrity for the life of the plant.*





- Process control systems ■
- Safety systems ■
- Analyzers and process analytical technology ■
- Instrumentation ■
- Advanced process control and optimization solutions ■
- Terminal management ■
- Oil movements and blending ■
- Information management systems ■
- Production intelligence ■
- PLC / Compact control products ■
- Fieldbus and wireless technologies ■
- Operator training systems ■
- Dynamic simulations ■
- Asset management solutions (AMS) ■

## Application examples

ABB as the Advanced Process Control (APC) vendor provide world-wide, a suite of the latest technology products and solutions to optimize the performance and maximise the refinery profitability. For a Far Eastern refinery, ABB's Predict and Control, state space multivariable controller, combined with ABB's inferential modelling platform, was used to tightly control the process units. This resulted in an increase of 3% to 9% profitability.

ABB as the MAC provided the turnkey single point responsibility to install and commission the complete gasoline blending system for a European refinery. The scope included the FTNIR analyzer, analyzer models, offline and online optimization, instruments, valves, blend header, composite sampler, prototype fuel tanks, additive systems, etc. The captured benefit was several million dollars per annum return.

The ABB process Fourier Transform Infrared (FTIR) analyzer for HF (Hydrofluoric Acid) Alkylation refinery process unit operation, jointly developed with ConocoPhillips, helps petroleum refineries to operate their HF alkylation units more efficiently and safely, while making a significant contribution to operational and environmental risk mitigation.



## A Full Range of Solutions For integrated automation



*Working with our customers over the years, we have gained a thorough understanding of your requirements, which, combined with our expertise in new technology led us to develop Industrial IT. Today, Industrial IT System 800xA is the leading automation system in process industries, going far beyond the features offered by other Programmable Logic Controllers (PLCs) or Distributed Control Systems (DCSs).*

The 800xA system includes Asset Management, and TUV certified Safety Instrumented System capabilities (SIS), MES reporting, full audit trail facilities to track operator actions and changes, and OEE calculation tools to support root cause analysis of production performance. The system supports all 5 IEC61131 programming languages, FOUNDATION Fieldbus, PROFIBUS and HART compliant field devices. Overall production reporting, product traceability and compliance reporting is achieved for the user by having integrated information management facilities.

By the use of the ABB bi-directional interface to Intergraph's SmartPlant Instrumentation SPI (INTools) package, a reduction of 25% in the total engineering costs can be realized as well as reducing translation errors and providing plant lifetime documentation.

In the role of Main Process Analytical Contractor (MPAC), ABB provides analytical solutions from design engineering and specification at FEED stage through to the supply of complete analytical systems including sampling systems, analyzers, housings and analysis / modelling software. Having the widest range of analyzers, ABB provides better visibility and quality control.

To enhance our automation offering we've developed a complete range of standard and industry specific instrumentation and control libraries for plant device and equipment control providing superior operator visibility.

Advanced process control and inferential modelling from process experts can be applied either as part of a new system installation or later once production has been established and constraints have been identified in the existing assets.

## Asset Information operational gains

- Complete instrumentation, automation and electrical portfolio meeting the needs of the process industries – we manufacture, engineer and install safe, reliable and secure solutions.

- Asset information that's effectively organized – 800xA technology acquires, analyzes and aggregates automation and asset information. Asset management solutions are built in, not added as an option.

- Improved return – we offer management decision support, process and instrumentation / automation expertise.

- 800xA provides flexibility for device management with a comprehensive library of field devices, supporting multiple fieldbuses with inherent device diagnostics.

- Integrated automation, electrical and telecom user environment.

*800xA provides all the facilities oil refining operational personnel could need in one system.*





LV / MV / HV electric power systems

Combined heat and power plants

Electric power distribution systems

Power management systems

Electric control systems

Electric motors

Variable speed drives

## Application examples

Looking to reduce risk and improve project implementation, this polymer producer selected ABB as their Main Electrical Contractor (MEC) for their new chlorine plant. The supply included electrical equipment—90MVA transformer, 132kV / 22kV switchgear, 50 MVA filter, 132kV switchgear, 6kV switchgear, an electrical protection and control system—and infrastructure work including cabling, installation, piping, mechanical and civil modifications. Taking on full responsibility for design, analysis, engineering, procurement, project management, installation and commissioning of the complete system, ABB was able to complete the project 2 months ahead of schedule.

For a major complex, ABB supplied the complete control system for their Combined Heat and Power plant that included both electrical power and steam load shedding. This allows the plant to manage their energy utilization effectively across the site, and avoid blackouts.

The customer wanted to reduce fuel consumption and pollution. ABB delivered a Power Management System (PMS) for optimized power generation and distribution. The supplied PMS power distribution system optimizes production based on available power capacity. To ensure environmentally friendly, state-of-the-art power management, ABB was involved from FEED phase to commissioning.



## Single Source Supply Of total integrated electrical solutions



*ABB is one of the largest manufacturers of electro-technical products and systems. Our high-efficiency Low Voltage, Medium Voltage and High Voltage products meet the standards of the refining industry.*

ABB has been at the forefront in developing electro-technical solutions that comply with new requirements for energy efficiency, control and safety. Featuring high reliability and performance, our electrical products are suitable for the full range of process plant applications. By the use of IT industry standard communication protocols and the Industrial IT enabled type tested solution, ABB reduces risk, project implementation time and operational propagation delays thereby improving the time to market and production throughput.

Historically, electrical control systems, power management systems and load-shedding systems were handled separately. 800xA extended automation combines these three functions into a single integrated system with significant cost savings and operational benefits.

Customers who use ABB for their electrical scope requirements experience improved system performance and significant cost savings. ABB is recognized as the leading supplier of AC motors, DC motors and variable speed drives.

For large project deliveries with a broad scope, and as a member of the integrated engineering team, ABB can optimize workflows, resources, and costs to accommodate the principal works schedule.

Increased quality, reduced power demand, improved electrical protection, integration efficiency and support for multiscope projects – ABB's involvement in your project means lower risk, tighter project schedules and improved Return On Capital Employed (ROCE).

## High Efficiency high rewards

- Complete Integrated Electrical Project Solutions – we manufacture, engineer and install reliable, safe and secure solutions.
- Proven, state-of-the art electrical building blocks – both operational reliability and open interconnectivity are provided for automation and integration with ABB and third-party devices.
- Increased electrical efficiency – we enable cost savings and health, safety, security and environmental benefits.
- Recognized benefits of a single engineered automation and electrical solution.

*Efficient electric power and drives solutions lower operating costs and reduce emissions.*





## Application examples

At an ethylene plant, ABB engineers implemented furnace controls and advanced process controls integrated to on-line analyzers to improve their profitability by 7%. The success of the project required an understanding of the clients particular process, their operating strategy and management strategy. The process understanding led to a knowledge of true constraints and true bottlenecks and the requirements of the APC application to push the plant to these real constraints.

ABB's Reliability Services performed an 18 month, multi-site improvement process, which focused on management leadership, lagging / leading success measures, risk based scheduling, operations and maintenance partnerships, root cause failure analysis, operations empowerment and preventive maintenance practices. By implementing ABB's recommendations, this company enjoyed annual savings of close to \$1 million in reliability costs and increased production of nearly \$3 million.

- Conceptual project design ■
- FEED support ■
- Generation of the User Requirement Specification (URS) ■
- Safety assessment ■
- Process and alarm philosophy ■
- Abnormal situation management ■
- Inspection services ■
- Integrity management ■
- Life of plant planning ■



# Lifecycle Excellence

## From concept to plant optimization

*Operational costs are lowered when ABB is involved from the start of the project. We are dedicated to finding solutions that satisfy your technical requirements, financial objectives and production goals. Your risks are reduced when you take advantage of ABB's experience and expertise across multiple disciplines.*

From the start of a project our full range of technical, project management and design expertise comes into play. When combined with our operational knowledge of the industry this makes a big contribution in helping you to define the right scope for your needs.

Our process safety skills are valuable in either an operational or project environment. With services ranging from the installation of fully instrumented safety systems to IEC 61508 / 11 to the leadership of hazard studies. Our process industry experience leads to fit for purpose, cost effective and pragmatic solutions that improve safety and meet regulatory requirements.

In operation, the 800xA control system with its Aspect / Object technology allows the storage and direct access to a wide range of information such as specific operator guidance and maintenance instructions. Along with the built-in asset management software, linked computerized maintenance management systems can reduce unplanned slowdowns or shutdowns by 40% and reduce maintenance labor by 63% during planned shutdowns.

We help process plant operators to comply with legislation and stakeholder expectations with regard to asset integrity. Our industry recognized expertise in integrity management provides an independent view of asset integrity and the supporting management systems and practices.

We guarantee efficient and effective hot cut changeover modifications in existing installations, having a specific engineering resource dedicated to hot changeover of ABB and non-ABB systems. Support for on-line changes and upgrades for multistream plants and those processes that never have a total plant shutdown are also catered for by the 800xA system.

CONCEPT » FEED » ENGINEERING » CONSTRUCTION » INSTALLATION » OPERATION » OPTIMIZATION



The single integrated solution



# Productivity and Profitability

## Through technology and services



*Operational excellence is achieved when continuous improvement strategies are matched with real-time feedback and analysis tools to maximize production and reduce operational costs. ABB services, used throughout the operations phase, deliver operational excellence. ABB can audit your plant and advise you of potential improvements to increase production rate and reduce quality variability*

Timely and reliable production information is vital in order to analyze and improve productivity. ABB's production information system offers an open architecture for data collection from ABB and third-party systems, and delivers customized reports.

Integrated solutions provide asset management of the refinery and downstream processes, optimization by advanced process control and the use of ABB's expertise and consultative services to reduce OPEX costs. Operational benefits are also enhanced by the use of targeted training and the use of the appropriate training simulators.

ABB Reliability Services provide solutions that improve safety, compliance and profitability. The World Class Reliability (WCR®) benchmark is a product of forty years of development. The benchmark process identifies best practices and compares an organization's performance level with other companies and industries. Qualitative and quantitative analysis are conducted of both reliability and maintenance practices, resulting in:

- Identification of performance gaps in the nine criteria of WCR
- Development of strategic and tactical plans to close the performance gaps
- Creation of a business case that documents the financial impact of addressing areas of opportunity

Following WCR, Total Plant Reliability® is addressed through a multi-staged improvement program. This comprises of focused empowerment of site personnel, asset management, maintenance prevention and balanced scorecard methodology. TPR provides a path to permanent reliability improvement that can easily result in a 3 to 1 return on investment.

## Operational profitability

Process knowledge and cross discipline competence give us the power to enhance your asset recovery.

Our multi-discipline, multiscope solutions increase production and product quality at a reduced operational cost.

Support services for ABB and third-party equipment.

System tools to identify loss production and root cause analysis.

Training including IT technology aspects such as security.

*Processes and solutions to improve operations and reduce operational expenditures.*



*ABB has standardized processes, procedures and tools throughout our worldwide service network so you always receive consistent, high-quality service and parts – whenever and wherever needed.*

ABB offers specialized performance improvement services, such as Overall Equipment Effectiveness (OEE) analysis, that are designed to enhance process operations. To ensure optimal equipment effectiveness, our OEE analysis may be supplemented with an implementation plan and implementation services. Performance improvement services cover just one of many service areas offered.

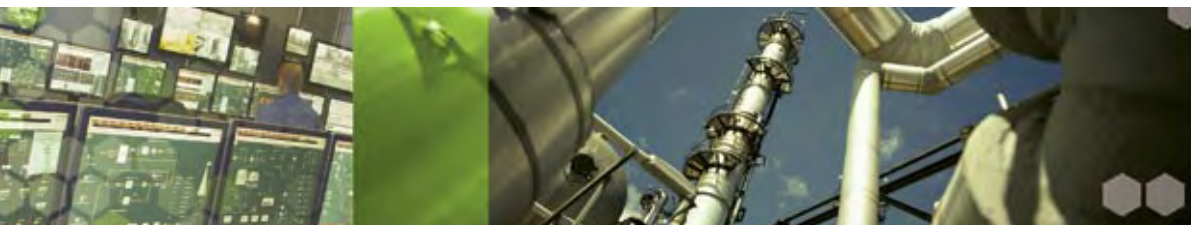
On-site, ABB services range from installation support to full project management. Adding ABB support and remote services allows you to minimize operational costs and increase productivity and revenues.

ABB's local and global service organization tailors the scope of the post installation support to suit client needs from on-demand support, spares availability through to full healthcare contracts whereby ABB maintains the complete automation and electrical assets.

For aging refinery installations, ABB offers migration and retrofit analysis. Our professional migration strategies and implementation result in low-risk improvements to the OEE level. As a leading supplier to the process industries, ABB offers step-up programs and software maintenance programs that reduce downtime and maintenance costs, including hot cut changeover expertise.

ABB's well-trained staff are able to increase both production and uptime. ABB offers a wide spectrum of training courses, including, product, operations, safety culture and safety assessment, held on site, at ABB facilities or electronically via our eLearning products.

Where users wish to outsource their maintenance requirements, ABB Full Service® will provide the asset management and maintenance of the installed, automation, electrical and telecom assets including the provision of personnel during both normal operations and planned shutdown requirements.



*ABB's future direction has always been influenced by the needs and challenges of our customers. Increased information flow and more stringent environmental requirements will certainly influence our future developments in the oil refinery and downstream sector.*

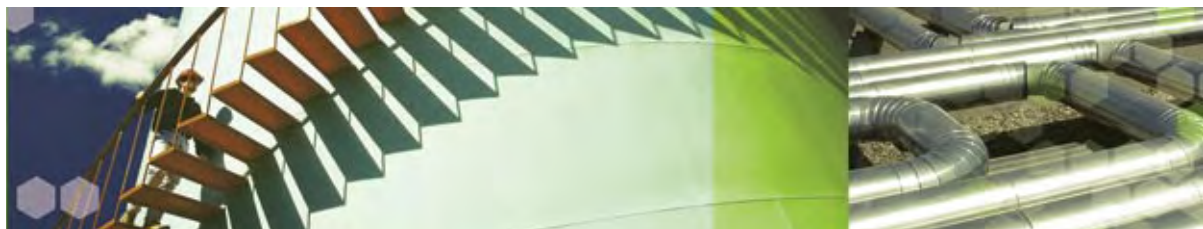
The growth of data source devices will create new challenges in areas such as alarm systems and operator interfaces. A major challenge with data source devices will be to avoid “data overflow” while taking advantage of the information flow to increase the degree of automation, optimization, remote control, remote support and diagnostics. ABB will continue to be the leading automation, electrical and analytical vendor and set the standards for integrated operations.

Such developments include the use of wireless and Ethernet technologies, process analytical technology (PAT), and the use of the ABB Extended Operator Workplace to provide better integrated visibility of the entire process plant and increase productivity.

As the needs of the oil refining and downstream industries evolve, ABB will meet these challenges with scalable products utilizing common building blocks and standardized software library solutions.

ABB employs hundreds of engineers and scientists in its corporate research laboratories and in addition has co-development activities with 50 universities.

As a leading technology provider ABB is actively involved in industry forums to contribute to and monitor trends in industry, markets and technology. This, along with direct input from our customers and consultants, shapes our development of new products and solutions for the oil refining and downstream industries.



**For further information please contact  
your local ABB office, or visit us at:**

**[www.abb.com/refining](http://www.abb.com/refining)**



**ABB Ltd.**

Howard Road, Eaton Socon,  
St Neots, Cambridgeshire PE19 8EU  
Te: +44 1480 475 321  
Fax: +44 1480 217 948

3BUS094530 en USCS 1300

© Copyright 2008 ABB Ltd. All rights to trademarks reside with their respective owners.

Specifications subject to change without notice. Pictures, schematics and other graphics contained herein are published for illustration purposes only and do not represent product configurations or functionality. User documentation accompanying the product is the exclusive source for functionality descriptions.