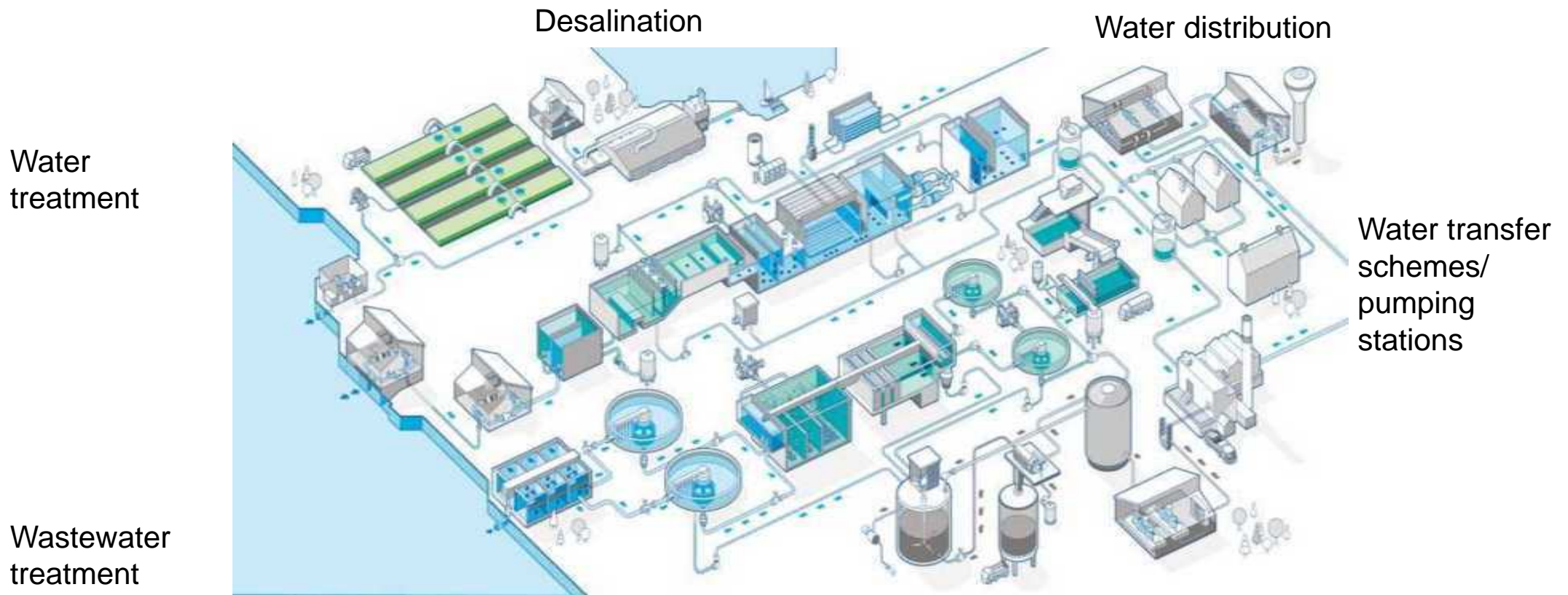




Water and wastewater – networks and plants











Water and wastewater – networks and plants

System solutions for all water cycle segments



Water and wastewater – networks and plants

Portfolio overview

	Desalination plants	Water transfer/ pumping stations	Water distribution/ pumping stations	Water and wastewater treatment
Automation				
electrical Balance of Plant (eBoP)				
mechanical Balance of Plant (mBoP)				

- For more than 40 years, ABB has been a partner to the global water industry with hundreds of reference installations
- ABB's offer to the water industry is focused on products, system solutions and services for automation and electrical equipment
- ABB's capabilities to deliver integrated system solutions for all water segments are a clear added-value for our customers

Water and wastewater – networks and plants

Excellence in execution of large and complex projects



ABB delivers complete, engineered and integrated system solutions for automation and electrification

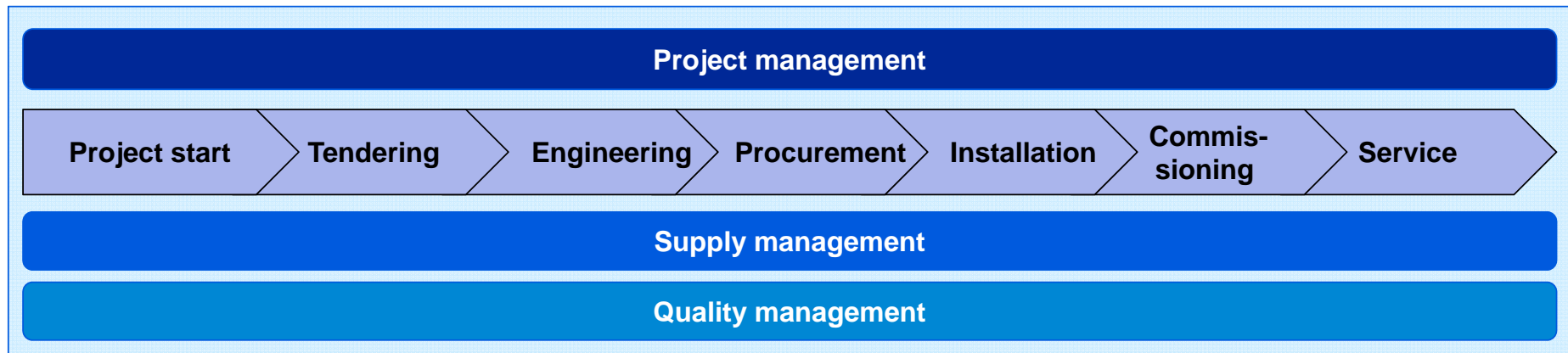
- Compliant with international standards
- Selection of optimal technology, optimized supply strategy
- Based on extensive process and domain expertise, level of integration and customization is defined
- Certified project managers
- Own, trained personnel: from FEED* to site management to commissioning

* Front End Engineering Design

Water and wastewater – networks and plants

ABB as partner for the complete project life cycle

Phases of the
project life cycle



Added value by

- **Cost oriented planning and engineering**
Higher efficiency at reduced investment cost
- **Leveraging system synergies**
Reduced maintenance cost, access to available, integrated features
- **Balanced management of chances and risks**
- **Supply by single source**
Minimized risks, reduced commissioning efforts
- **Using less interfaces**
Reduced administration cost
- **Applying optimized decision processes**
Saving of time and cost

Water and wastewater – networks and plants

Scope of project services

Engineering	Logistics	Design	Project management	Installation
Factory Acceptance Test (FAT)	Documentation	Site management	Erection	Trouble-shooting
Trainings	Training systems	3rd party system integration	Maintenance	Warranty
Procurement	Site Acceptance Test (SAT)	Studies	Handover management	Commissioning

Automation – Instrumentation – Electrical equipment – Mechanical equipment

Water and wastewater – networks and plants

System solution: scope of delivery “ICE*”

*ICE: Instrumentation –
Control – Electrical
Products



- **Instrumentation**

- Field instrumentation
- Analytical devices

- **Automation**

- **D**istributed **C**ontrol **S**ystem (DCS)
- **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition (SCADA)
- Telemetry and communication systems
- Advanced functions (simulation, optimization)

- **Electrical equipment**

- Substations (high, medium, low voltage)
- Transformers (high, medium, low voltage)
- Bus ducts
- Motors and drives (medium, low voltage)
- Uninterruptable power supply
- Emergency power
- Cabling

Water and wastewater – networks and plants

System solution: scope of delivery “MICE*” – for pumping stations

*MICE: Mechanical
equipment - Instrumentation
– Control – Electrical
Products



- **Mechanical equipment**

- Pumps
- Valves
- Main piping in pumping station

Plus

- **Instrumentation**
- **Automation**
- **Electrical equipment**

Water and wastewater – networks and plants

Electrical overview



- Integrated control and electrical systems for water plants
- Optimized conceptual and basic design for the complete balance of plant for all voltage levels comprising network studies and calculation for all related systems and components
 - High voltage switchgear with air insulated- or gas insulated design
 - Medium voltage switchgear
 - Main and auxiliary transformers
 - Variable Speed Drive Systems
 - Component design for best operating point

Water and wastewater – networks and plants

Electrical switchgear



Medium and Low Voltage Switchgears

- Optimized design and sizing for safe, short circuit resistance and flexible arrangement
- Proven design and type tested equipment from best in class in house feeder factories
- Adapting sizing of the different components for achieving optimized overall system
- Switchgear system calculation
- Network studies and calculations for short circuit resistance and load flow calculation
- Optimized cable connection

Water and wastewater – networks and plants

Communication

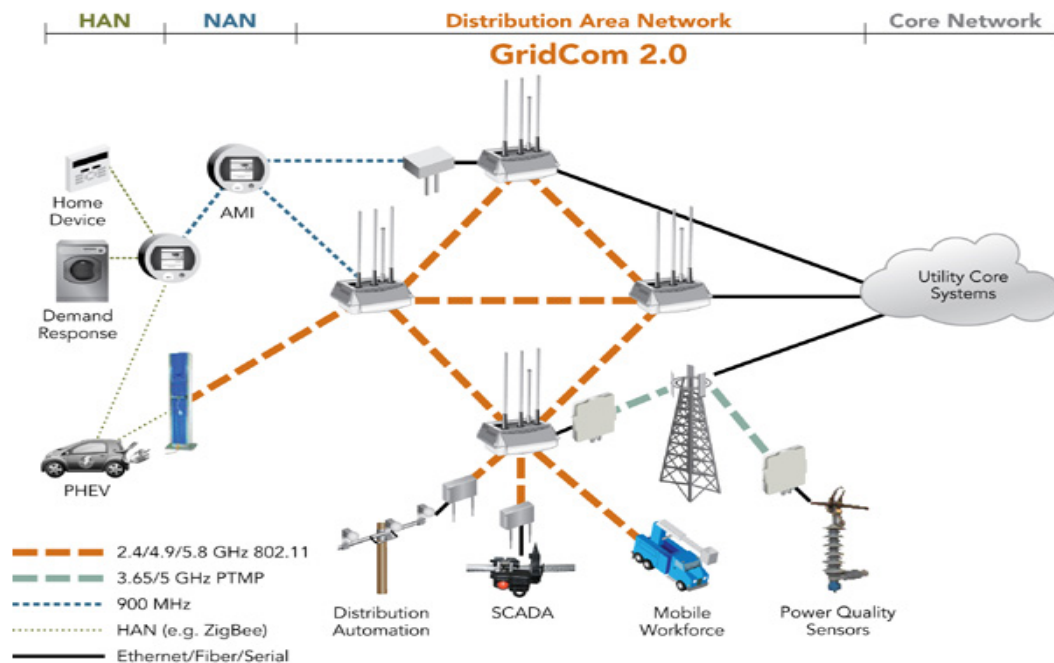


ABB offers wide range of communication products and solutions

- From optical network to radio network solutions
 - Example: Fox family solution, microwave radio communication
- Recent acquisition “Tropos”
 - Coverage of mesh routers, radio systems, management and analysis tools

Tropos „Smart Grids Distribution Area network“

Water and wastewater – networks and plants

System solution: a glance on instrumentation and analytical devices



For more than 100 years, ABB is a leading technology provider for instruments and analytical devices

Comprehensive range of instruments and analytical devices

- Flow and pressure
 - On a global scale: strongest offer for flow measurements: unmatched number of different measurement principles, type variants and applications
- Water analytics: ammonium, conductivity, dissolved oxygen, fluoride, pH, phosphate, RedOx, turbidity, nitrate
- Temperature sensors
- Recorders

Water and wastewater – networks and plants

System solution: a glance on Symphony™ Plus automation

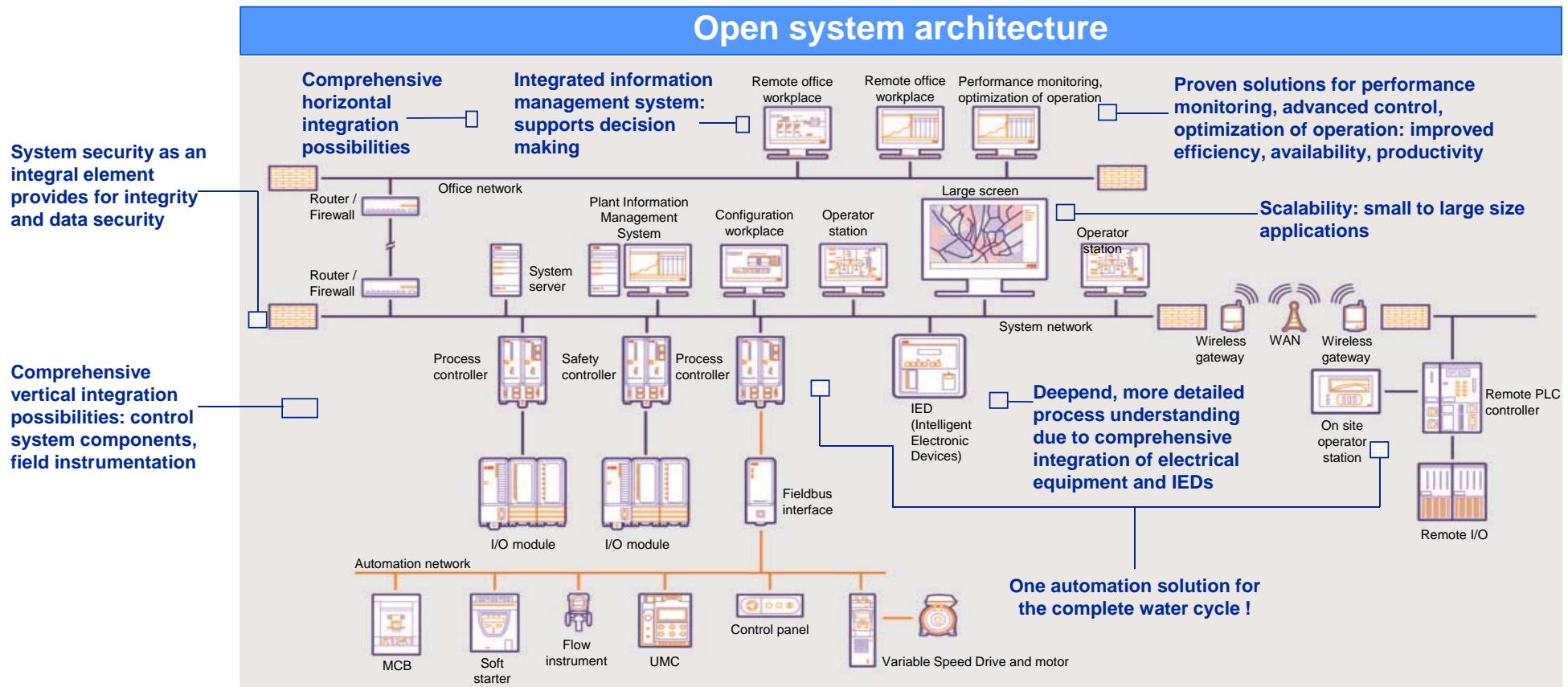


Symphony Plus: ABB technology for automated and optimized operation, for monitoring and control of all water cycle applications

- Monitoring, control and optimized operation of water cycle processes
 - Controllers, RTUs, scalable and modular PLCs
 - Water-specific, advanced applications
- Comprehensive portfolio of communication products and solutions
 - From optical to radio networks, from network routers and radio systems up to management and diagnosis tools
- Support in managing the challenges of the water industry
 - Improved productivity and efficiency
 - Ensures high availability, operational safety, system and plant security
 - Optimized life cycle cost

Water and wastewater – networks and plants

System solution: a glance on Symphony™ Plus automation



Water and wastewater – networks and plants

System solution: a glance on intelligent water network monitoring

ABB invested in TaKaDu, a worldwide leading provider of solutions for water network monitoring



Water loss reduction

Detection efficiency

Increased availability

Improved visibility

Operations
optimization

Energy savings

Increased compliance

Compliant anticipation

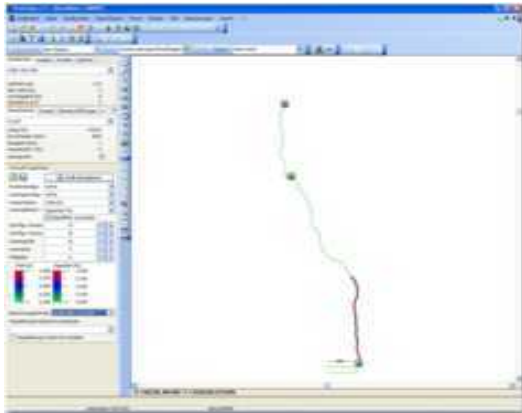
Enhanced planning

- Software-as-a-Service
- Additional information from data
- Early recognition of operational problems and efficiency: generation of high precision real-time alarms
- No adaptation of network
- Cloud-based
- Minimized losses: quick detection, early advice, minimized period of defect
- Higher level of maintenance effectiveness and efficiency
- Symphony Plus – integrated or stand-alone

Water and wastewater – networks and plants

System solution: a glance on dynamic network calculation

Example: Shoaiba Phase 3
Water Transportation
System, Saudi Arabia



- System for static and dynamic network calculation, simulation and optimization
 - Hydraulics
 - Water quality
- Areas of use:
 - Optimized real-time control
 - Network planning and extension
 - Data validation
 - Leakage detection and localization
 - Early warning: process changes, alarms
 - „What-if“ scenario calculations
- Integration with control system: real time data, process data management, alarm management

Water and wastewater – networks and plants

System solution: a glance on mechanical equipment (pumping stations)



- Core of pump station: pump with drive train
- Planning, engineering and implementation of automation and electrical equipment according to requirements
- Realization of synergy potentials by optimized interfacing
- Comprehensive consideration of mechanical components within the pump station: planning and execution of complete system according to hydraulical requirements
- Offer includes pumps, main piping, valves and surge vessels
- From planning and design to procurement to commissioning

Water and wastewater – networks and plants

System solution: a glance on motors and drives



- Optimized design and engineering for complete drive train including
 - Transformer
 - Drive
 - Motor
- Design and engineering considering the best operational set-points of the individual components
- Adapted and matched dimensioning of the different components

Water and wastewater – networks and plants

Service portfolio: life cycle support and customer service



Water and wastewater – networks and plants

Service portfolio: life cycle support and customer service



ABB covers the complete portfolio of instrumentation, automation and electrical equipment

- Electrical works
- Control system migrations
- Retrofit, upgrades, extensions
- Service and maintenance contracts
- Troubleshooting: on site or remote access
 - Service sites in more than 50 countries
 - Fast reaction
 - Problem-solving

Shuwaihat II, Abu Dhabi, United Arab Emirates



Shuwaihat WTS Phase II

Customer: Abu Dhabi Transmission
and Dispatch Company
(TRANSCO)

Year of commissioning: 2013

Customer need

- Enlargement of 250 km water transmission pipeline from Shuwaihat to Abu Dhabi up to 100 million gallon per day

ABB's response

- Extension of pumping stations Shuwaihat and Mirfa as EPC
- Scope of delivery: complete mechanical equipment, electrical equipment, telemetry, control system, instrumentation plus extension of pump station buildings
- Complete scope of services: from planning to erection and commissioning

Customer's added value

- Optimized interface between all pumping stations
- Single source for complete scope supply
- Single source responsibility for aftersales services

Toshka, Egypt



Mubarak Pumping Station

End customer: Ministry of Public and
Water Resources

ABB customer: Hitachi, Japan

Year of commissioning: 2003

Customer need

- Extension of existing water transfer infrastructure with the objective to pump water from Sheik Zayed canal system around Toshka for irrigation purposes

ABB's response

- Deliver of complete electrical system for Mubarak pump station to the EPC
- Electrical system including drives, cabinets, motors, transformers, uninterruptable power supplies
- Comprehensive project services: from planning, design and engineering to erection and commissioning

Customer's added value

- Optimized and integrated solution for the complete electrical package
- Single source of supply including comprehensive project service

M.A.O. , Algeria



Mostaganem–Arzew–Oran Pumping Station

End customer: Agence Nationale des
Barrages et Transferts
(ANBT)

ABB customer: MAPA, Turkey

Year of commissioning: 2013

Customer need

- Expansion of drinking water supply for the cities of Mostaganem, Arzew, and Oran (MAO) by 155 million m³ per year
- Complete project: construction of dam, water intake, sedimentation pond, pump station, 220 kV outdoor substation, reservoirs

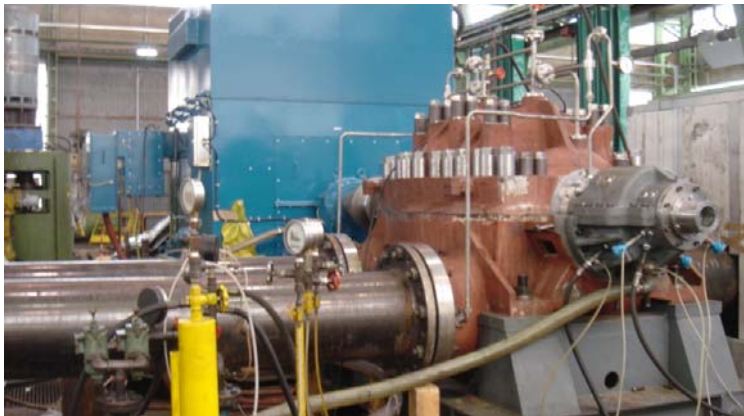
ABB's response

- Supply of mechanical and electrical equipment, automation including uninterruptable power supply, instrumentation for the pump station to the EPC
- Mechanical equipment: pumps, surge vessels, main piping, valves
- Electrical equipment: substation, transformers, diesel generators, drives, motors including cooling system
- Comprehensive project services: from planning, design and engineering to erection supervision and commissioning

Customer's added value

- Single source of supply for given scope
- Optimized process connections and interfaces
- Maximized use of ABB products and technologies

Shoiba 3, Saudi Arabia



Shoiba Water Transfer Pumping Station

Saline Water Conversion Corporation

SWCC, Saudi Arabia

Customer: SSEM, Saudi Arabia

Year of commissioning: 2010

Customer need

- Extension of water supply system from Shoiba water desalination plant to Mekka, Jeddah and Taif with 4 new pipelines and pumping stations

ABB's response

- Delivery of complete automation and electrical system including SCADA as well as instrumentation to the EPC
- Electrical system: substation, cabinets, transformers, frequency converters, motors, motor starters, diesel generators
- Comprehensive project services from planning, design and engineering to supervision of erection and commissioning

Customer benefits

- Seamless integration of electrical and control system
- Single source of supply

Maagta RO Desalination Plant, Oran, Algeria



Maagta RO Desalination Plant

Customer: Hyflux Ltd. Country

Year of commissioning: 2011

Customer need

- Construction of the world's largest Seawater RO plant (500.000 m³/day)

ABB response

- Complete electrical plant system including design, engineering, supply, erection and commissioning
- Implementation of 33 medium voltage drives to reduce plant electrical losses from the benchmark target of 5% to only 3%

Customer benefits

- Seamless integration of electrical system
- Single source responsibility
- Drives will speed up the long plant startup process after maintenance or power-failure related shutdowns, reducing the length of plant downtime

Benghazi Conveyance Pumping Station, Libya



Benghazi Conveyance Pumping Station 319

Customer: Great Man-Made River
Utilization Authority, Benghazi, Libya

Year of commissioning: 2008

Customer need

- Supplying the conveyance and distribution system with water for use of irrigation of new farm land

ABB response

- Electrical, instrumentation SCADA and automation systems
- Complete responsibility for design, engineering, procurement, erection and commissioning

Customer benefits

- Seamless integration of electrical and control system
- Single source responsibility

Kalu Ganga Water Supply, Sri Lanka



Kalu Ganga Water Supply Project

Customer: National Water Supply & Drainage Board, Sri Lanka

Year of commissioning: 2007

Customer need

- New treatment plant and pumping station for supplying drinking water to Greater Colombo south

ABB response

- Electrical, instrumentation SCADA and automation systems
- Complete responsibility for design, engineering, procurement, erection and commissioning

Customer benefits

- Seamless integration of electrical and control system
- Single source responsibility

ABB system solutions for the water and wastewater industry

- World's largest provider of electrical systems and automation solutions to the water industry
- Comprehensive expertise, water specific domain knowledge
- More than 40 years of experience: extensive understanding of customer needs and requirements
- Effective and efficient execution:
 - High quality delivery
 - Retrofit and expansion without interruption of operation
- Support for developing a long-term and sustainable automation and electrification strategy
- Long-term partnership
 - Comprehensive service offering
 - Global service organization

Power and productivity
for a better world™

