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

- 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
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

- **Project management**
  - Project start
  - Tendering
  - Engineering
  - Procurement
  - Installation
  - Commissioning
  - Service

- **Supply management**

- **Quality management**

**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

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### Automation – Instrumentation – Electrical equipment – Mechanical equipment
Water and wastewater – networks and plants
System solution: scope of delivery “ICE*”

- **Instrumentation**
  - Field instrumentation
  - Analytical devices

- **Automation**
  - Distributed Control System (DCS)
  - Supervisory Control And Data Acquisition (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

*ICE: Instrumentation – Control – Electrical Products*
Water and wastewater – networks and plants
System solution: scope of delivery “MICE*” – for pumping stations

- **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
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
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

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

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

Open system architecture

- Comprehensive horizontal integration possibilities
- Integrated information management system: supports decision making
- Remote office workplace
- Remote office workplace
- Performance monitoring, optimization of operation
- Proven solutions for performance monitoring, advanced control, optimization of operation: improved efficiency, availability, productivity
- Scalability: small to large size applications
- Deepend, more detailed process understanding due to comprehensive integration of electrical equipment and IEDs
- One automation solution for the complete water cycle!

System security as an integral element provides for integrity and data security

Comprehensive vertical integration possibilities: control system components, field instrumentation

Open system architecture
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

- 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 loss reduction  Detection efficiency  Increased availability
Improved visibility  Operations optimization  Energy savings
Increased compliance  Compliant anticipation  Enhanced planning

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System solution: a glance on dynamic network calculation

- 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 chances, alarms
  - „What-if“ scenario calculations
- Integration with control system: real time data, process data management, alarm management

Example: Shoaiba Phase 3 Water Transportation System, Saudi Arabia
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

Service contract and asset management

- Project-management
- Asset management
- Environmental services
- Training
- Upgrades and retrofits
- Engineering
- Evolution
- Installation
- Diagnosis and Consulting
- Commissioning
- Maintenance
- Troubleshooting
- Spare parts and repair services
- Support and remote services
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

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

Shuwaihat WTS Phase II
Customer: Abu Dhabi Transmission and Dispatch Company (TRANSCO)
Year of commissioning: 2013
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

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

Mostaganem–Arzew–Oran Pumping Station
End customer: Agence Nationale des Barrages et Transferts (ANBT)
ABB customer: MAPA, Turkey
Year of commissioning: 2013
Shoiba 3, Saudi Arabia

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

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

Benghazi Conveyance Pumping Station 319

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

Year of commissioning: 2008
Kalu Ganga Water Supply, Sri Lanka

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

Kalu Ganga Water Supply Project
Year of commissioning: 2007
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