Introducing ABB Water for Process Industry
Sustainable Water Use in Process Industries
What is Sustainability?

- **Sustainability** relates to the maintenance and enhancement of environmental, social and economic resources, in order to meet the needs of current and future generations.

- The three components of sustainability are:
  - Environmental sustainability
  - Social sustainability
  - Economic sustainability
Industrial Water Applications

- Industrial Treatment and Re-use Plants
- Waste Water Treatment and Re-use Plants
- Industrial Water Use
- Municipal Treatment Plants
- Distribution Networks
- Pumping Stations
- Irrigation Networks
- Desalination Plants

= ABB Target in Process Industries
Future Priorities for Water?

**DOMESTIC WATER FUTURE:**
- Reduced consumption
- Use of alternative water sources
- Improved quality of supply water
- Reduced environmental impact of treatment processes
- Advanced control, monitoring and management systems

**AGRICULTURAL WATER FUTURE:**
- Increased use of non conventional resources
- Intelligent irrigation systems
- Reduced environmental impact
- Optimized control of irrigation

**INDUSTRY WATER FUTURE:**
- Reduced water demand
- Increased water reuse and recycle
- Reduced environmental impact
- Optimized energy and water together
- Advanced monitoring and control

**Share of Water Usage:**
- Agricultural: 60%
- Domestic: 20%
- Industrial: 20%
Historical Process Industries Water Use

- All Process Industries use water
- Water is “borrowed” from the environment
  - Treated as needed
  - Used once
  - Treated again
  - Thrown away

- The Water Supply Chain

The continued use of water in this way is unsustainable
Impact of Water Use on Process Industries

- Water has a major impact on production processes, affecting
  - Operating costs
  - Product quality
  - Manufacturing efficiency
  - Downtime
  - Health & Safety
  - License to Operate (wastewater discharge)
  - Ability to operate through water shortages

KEY MARKET DRIVERS
- Water availability
- Water quality
- Environmental compliance
- Operating efficiency
What does this mean for Process Industries?

- Design Standards
- Operating Standards
- Responsible abstraction
- Compliant discharge
- Maximum reuse and recycle
- Plant reliability – no loss of containment
- Production efficiency – minimum energy
- Measurement, Monitoring and Management
- Sustainable Water Use
- Social and Environmental Responsibility
Journey to Sustainable Water Management

Step 2: Housekeeping

Step 3: Management of Water Systems

Step 4: Reuse of Water Without Treatment

Step 5: Recycle of Water After Treatment

Step 6: Redesign Systems with No Water Use

Water Saving

- Reductions in wastage
- Leaks
- Untended taps and hoses
- Better cleaning methods
- Sprays in place of fill and drain
- Hose triggers
- Awareness
- Education and training

There is little point looking for other water savings unless housekeeping is under control.

Better operation of existing water uses

Utilities
  - Cooling systems
  - Boilers
  - Water Treatment Plant
  - Process
  - Product washing
  - Scrubbers and strippers
  - Product formulation

The reuse of water without further treatment

Ideally direct use without need for tanks, pipework and pumps

Potential sources include
  - RO reject water
  - Demineralisation plant final rinse waters
  - Process waters
  - Use for duties which tolerate lower grade water
  - Cleaning duties
  - Cooling systems
  - Raw material dissolution/dilution

Reuse of treated effluent or treatment at source

Distributed Effluent Treatment

Looking for minimum treatment options

Chemical treatment
  - Suspended solids removal
  - Softening
  - pH adjustment
  - Membrane treatment

Essential to understand where water need not be used

Cost, practicality, management, risk

Can redesign to use less water, e.g. closed systems

Or no water at all, e.g. fin fan coolers

Greater opportunities for new plants than old plants

Requires vision, investigation, research, plant trials…

May not be “off the shelf”
“Typical” Water Savings Achievable

- But this depends on where you start
- And what your process is …
ABB Key deliverables in Water for Process Industries

- Process Automation & Safety Solutions
- Integrated Control and Electrical systems
- Electrical/Automation products and related services
- Performance Services including asset management full services.
- Turnkey projects
- Consultancy Services
ABB Product Portfolios - Water

- Asset Optimization
- MV Drives
- LV Drives
- Water Analyzers
- Substations
- HV Switchgear
- PLC
- Control Systems
TurnKey Plants – ABB Strengths and Capabilities

- Basic and detailed plant design
- Project Management and Project Control
- Procurement and Subcontracting
- Construction
- Commissioning & start-up
- Full Service & Maintenance Services
- Advanced IT systems and interconnections
ABB Design and Consultancy Services

Extensive experience in industrial water treatment consultancy for water treatment plants, cooling systems, boilers, process water use and wastewater treatment plant

Scope

Water Supply

TOTAL WATER

Water Use, Reuse, Recycle

Effluent Treatment

Capabilities

Water Chemistry

TOTAL WATER

Managing

Minimizing

Process Engineering

Biological Treatment

Optimizing
Examples of ABB Projects in Process Industries
BBK/BBKN Water Injection Project

DESCRIPTION:
Block 404 Bir Berkine/ Bir Berkine Nord Oil Fields Development.

CLIENT: Sonatrach
COUNTRY: Algeria
LOCATION: Bir Berkine / Bir Berkine Nord
YEAR: 2007

BRIEF SCOPE OF WORK:
- Crude oil and gas processing facilities
- Oil-25000BPD and Gas 2.4MMNm3/day
- Pipelines- Gathering-Cleaning-Export system
- Gas and Oil Lift systems
- Water reinjection system
- Waste Discharge

TYPE OF CONTRACT:
Engineering, Procurement, Fabrication & Construction, Commissioning & Start-up
KNO3 Crystallization Plant – Chile

Description:
Potassium Nitrate Plant suitable for a production capacity of 48,000 kg/hr.

Client: SQM (Sociedad Química y Minera de Chile)
Country: Chile
Location: Coya Sur
Scope of Work: Engineering & Procurement and Construction

Brief Scope:
• Complete Turbines-Boilers
• Entire utility systems
• Mech-Elec-Control-Aux Systems

Description of Water Packages:
• Demineralization Plant
• Cooling Water units including towers.
• Fire Water systems
• Steam and Hot water Generation system.
• Waste Water treatment.
• Electrical, Instrumentation and Automation.
Description:
Realization of n° 1 Oily Water treatment Plant with a capacity of 500 m³/h including filtration, fine filtration and reinjection.

Client: SONATRACH – Division Production
Location: Hassi R’Mel - Algeria
Scope of Work: Engineering, Procurement, Fabrication and Construction, Commissioning & Start-up

Scope:
- Oily Water Treatment Unit and Filtration Unit
- Utility and Fire water system.
- Complete Electrical and Automation System.
- Equipment:
  - 500 m³ storage tank
  - Corrugated Plate Interceptor (CPI)
  - Flocculation basin
  - Dissolved Air Flotation (DAF)
  - Treated water tank
  - Oily Water filtration and fine filtration unit capacity of 1500cumt/day
Full service - Water Treatment

Description
- Full Service Contract at a Hassi'R Mel - Gassi Touil, Algeria Desoliage Plants
- Awarded by Sonatrach
- 4 Desoliage Stations
  - 3 at Hassi'R Mel
  - 1 at Gassi Touil

Scope
- Contract includes
  - Global Revamping
  - Operation
  - Maintenance
  - Water Quality Monitoring
  - Training
Realization of a new power generation plant open cycle aimed at providing 320 MW electrical power to the ENI Oil & Gas plants.

**Client:** ENI Congo S.A.

**Country:** Congo

**Location:** Djeno

**Scope of Work:** Engineering, Procurement and Construction

**Brief Scope:**
- Complete Turbines-Boilers
- Entire utility systems
- Mech-Elec-Control-Aux Systems

**Description of Water Packages:**
- Demineralisation Plant
- Cooling Water units
- Fire Water systems
- Oily Water system
- Waste Water treatment
- Potable water unit
- Electrical, Instrumentation and Automation.
Major Steel Producer - England

Description:
- Major Steel production site
  - Very large – 15 sq miles; Multiple large production plants
  - RO + Demin plants; 45 cooling systems, 2 large power plants, plan for new CHP plant
  - 2 reservoirs with limited capacity
- Currently producing 4.1 Mte/y special grades of steel
- Plan up to 30% increase production
- Water consumption per te steel at industry best
- Already at limit of available water resources...

Scope of Study:
- Assessment of present position
- Strategy to meet future production plans

Conclusions:
- Present conditions would not support increased production without better demand management
- Infrastructure ageing and unreliable – needs upgrading
- Increased water reuse and recycle essential
- Major new supply source required
- Development plan approved
Major Chemical Producer - England

Description:
- Large Chemical production site
  - Multiple large production plants
  - Demin plants; 30 cooling systems, 2 boiler plants
- Need to install new demineralization capacity in excess of 600 m³/h for boiler and process use
- Variable quality raw water, variable steam and process condensate returns, variable demand

Scope of Supply:
- Produce design specification to meet future demand
- Take into account both Capex and Opex
- Limited space available
- Detailed design review
- Commissioning support and acceptance trials

Conclusions:
- Based on detailed demand review, plant capacity 40% smaller than proposed by OEM’s saving CAPEX and space.
- Design allowance to maintain output despite resin ageing
- Detailed design reviews conducted to confirm calculations
- Recommended improved quality monitoring
- Plant commissioned successfully
- After 3 years meeting design performance
Value proposition for water applications

PRODUCTS

TURNKEY
Abb Total Solutions

**PRODUCT TECHNOLOGIES**
- UPS
- Field devices
- DCS, SCADA, PLC, etc
- Instruments - Analytics
- Networking & Telecommunications
- LV, MV Drives, Motors, MCC, etc.
- HV, LV Switchgear
- Transformers

**EPC KNOWHOW**
- Turnkey - LSTK approach
- Process & Plant knowhow
- Plant performance fulfilling customer objectives
- Multi-discipline knowhow
- Third party products integration
- Risks/responsibility for the plant
- Worldwide / local execution

**INDUSTRY SPECIFIC KNOWHOW**
- Customer knowledge
- Huge installed base
- Full services for O & M
- Water and process industry knowhow
- Integrated system approach
- Performance services world wide
- Industry specific hardware/software/system engg knowhow
Summary

- ABB is one of the top Electrical and Automation players in products, services and systems.

- ABB is increasingly offering turnkey plants into water intensive applications such as Energy, Ethanol, Oil Gas Petrochemicals, Utilities plant for general industries, etc.

- ABB is strongly growing its existing capabilities in water to be able to provide technological and economical benefits to industrial customers.

- ABB is committed to building water technologies and solutions to provide benefit to the Process Industries sector.
Power and productivity for a better world™