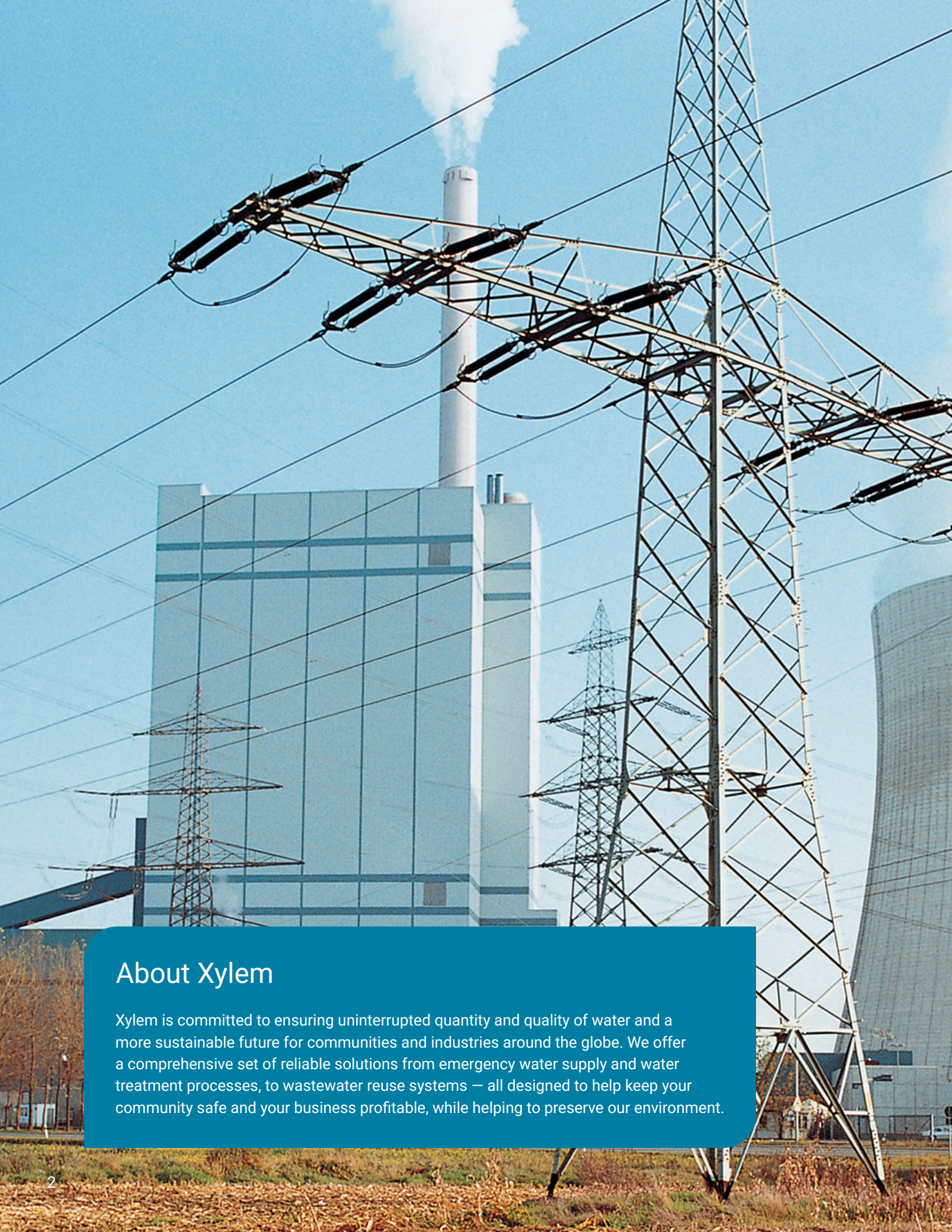
xylem

Innovative water technologies for maximum efficiency and profitability

Solutions for the power generation industry from one reliable source





About Xylem

Xylem is committed to ensuring uninterrupted quantity and quality of water and a more sustainable future for communities and industries around the globe. We offer a comprehensive set of reliable solutions from emergency water supply and water treatment processes, to wastewater reuse systems — all designed to help keep your community safe and your business profitable, while helping to preserve our environment.

The power of experience and expertise

Today's power producers face a multitude of challenges. In addition to maintaining a reliable source of high-quality water, you're also responsible for finding new ways to reduce costs, increase efficiency and meet an ever-changing list of environmental regulations.

Xylem has the answers. With over 2,000 installations worldwide, we offer the experience and proven track record you need to grow and adapt. Our innovative and reliable solutions are suitable for all fossil and nuclear power plants and are designed to help you recover and recycle the maximum amount of water possible, while achieving 100% environmental regulatory compliance. From raw water debris removal to wastewater clean up, our experts can handle virtually every water issue a power generating plant will encounter. So whether you need to reduce your water consumption, reclaim or recycle wastewater, eliminate hazardous chemical handling or provide high-purity water for supercritical boilers, we can help you meet each challenge with proven technologies that save time and money.

The benefits of working with the global leader

Xylem offers multiple advantages to power utilities and independent power producers:

Process knowledge

By understanding the various processes involved in water treatment, we can successfully integrate multiple technologies into one water system for maximum operational improvements and cost savings. We manufacture our own broad base of technologies for water processing. Xylem's AQUA Pro service professionals are fully trained in all aspects of equipment operation and will ensure your staff is up to speed with every part of the process, while we get your system up and running.

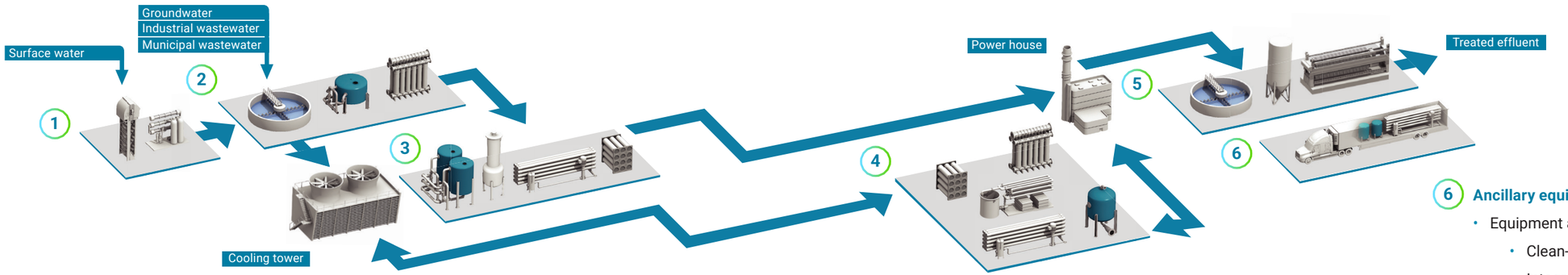
Customer specific solutions

At Xylem, we don't make your needs fit our solutions — we customize solutions to meet your needs. With both new and retrofit systems, we can help solve your most unique water and wastewater challenges. Our experts will fully evaluate your circumstances, drawing on our diverse technology offering to determine the optimal approach, while assisting you in meeting all standards, regulations and corporate sustainability targets.

Superior customer service

From planning, implementation and commissioning, to maintenance and modernization, Xylem offers a broad range of integrated field and support services to help protect our customers, their employees and their investment. Our flexible solutions make it easier to adapt to changing market conditions, enhancing your competitiveness and profitability, while allowing you to focus on your core competency. And with a full R&D laboratory supporting existing systems and helping to minimize risk, our preventative support helps you identify problems before they occur, improving reliability and efficiency while helping to maximize uptime.

Comprehensive water technologies and services for the power generation industry



1 Water intake

- Intake screening
  - Trash rakes
  - Traveling water screens
  - Rex® modified ristroph fish handling screens
- Chlorination systems
  - Chloropac® systems for seawater electrochlorination
  - Gas chlorination systems
  - OSEC® on-site electrolytic chlorine generation systems

Solutions and product highlights

Xylem has unrivaled experience providing dependable and efficient intake solutions for your site-specific environment. Our two-stage intake screening systems utilize automatic trash rakes followed by proven water screening technologies, including the Rex® Modified Ristroph fish protection traveling water screen.

Our systems ensure debris-free water while minimizing ecological impact, reducing life cycle costs and extending service life.

Our industry standard Chloropac system provides the most effective, environmentally safe method of preventing biological fouling using technically superior equipment for energy efficient, long-term plant operation.

2 Pretreatment

- High-rate clarification
  - CoMag® systems
- Membrane filtration
  - Vantage® ultrafiltration systems
- Media filtration
  - Vantage multimedia filtration systems
  - Vantage carbon filtration systems
- Precipitation/softening
  - Cold lime softening systems

Solutions and product highlights

Selecting the right pretreatment system is vital to the successful operation of downstream make-up and cooling water systems. From surface water and ground water to recycled waste streams, Xylem offers solutions that eliminate suspended solids, colloidal matter, organics, iron and manganese.

Our Vantage ultrafiltration systems protect and extend the life of downstream equipment, while accounting for seasonal changes and variations in source water — all in a smaller footprint by replacing multiple steps of conventional methods with a single filtration step and using fewer chemicals with less waste, resulting in lower operating costs.

3 Demineralization/degasification

- Ion exchange systems
  - Mixed bed deionization
  - Individual bed deionization
  - Vantage softener systems
- Reverse osmosis systems
  - Vantage single pass/double pass reverse osmosis systems
- Electrodeionization
  - Ionpure® VNX electrodeionization systems
- Degasifier systems
  - Vacuum and membrane
- Catalytic oxidation reduction systems

Solutions and product highlights

Boiler feed water often contains contaminants that can cause deposits, corrosion and carryover in the boiler and associated steam generation equipment. With our innovative membrane treatment approach our solution achieves consistent and cost-effective boiler feed water, guaranteed.

Part of the solution is our Vantage reverse osmosis system that produces high-quality demineralized water. In addition, our Vantage VNX Electrodeionization System (CEDI) uses a chemical-free deionization process that is superior to Mixed-Bed Ion Exchange (MBDI) systems.

4 Water reclaim and reuse

- Condensate polishing
  - Offsite resin regeneration
- Steam generation blowdown
  - Ionpure VNX electrodeionization systems
- Cooling tower blowdown
  - Memtek® microfiltration softening systems
  - Vantage reverse osmosis systems
  - Vantage ultrafiltration systems

Solutions and product highlights

With strict regulations on water usage and discharge, power producers looking to expand or maintain their operations are often forced to reclaim or reuse their wastewater. Xylem offers a variety of reclaim and reuse solutions to help maximize efficiency and reduce operational costs.

Condensate polishing improves power plant performance by reducing losses or damages caused by corrosion and deposits. With more than 50 years of experience in condensate polishing, we offer a wide range of solutions including deep-bed condensate polishers with offsite regeneration systems, special resin grades, off-site regeneration and mobile services.

5 Wastewater treatment

- Flue Gas Desulfurization (FGD) wastewater treatment systems
- Sludge thickening, dewatering and drying systems
- Chemical precipitation systems
- Multi-stage pH neutralization systems
- Continuous backwash filter

Solutions and product highlights

Wastewater treatment is critical to plant operation, from both an environmental and corporate sustainability perspective.

Xylem offers a wide range of solutions to meet specific geographical, regulatory and operational challenges.

For new and retrofit FGD projects, our physical/chemical system is specifically designed to desaturate effluent, precipitate heavy metals and reduce suspended solids by flocculation, settling and dewatering. And as regulations on discharged water become more stringent, our experts continue to develop innovative solutions for enhanced metals removal.

6 Ancillary equipment & services

- Equipment and systems
  - Clean-in-place systems
  - Integrated instrumentation and controls
  - Pumps
  - Storage tanks
- Services
  - Intake inspection and repair dive team
  - Maintenance contracts
  - Metals polishing systems
  - Mobile filtration, demineralization and reverse osmosis systems
  - Off-site resin regeneration
  - Process evaluation and optimization
  - Spare and replacements parts
- Remote monitoring
  - Link2Site® monitoring and control systems

Solutions and product highlights

Products and services from Xylem are designed to operate reliably in a challenging work environment and are supported with customized service and maintenance contracts that help increase operational efficiency, maximize worker productivity and deliver greater control over your budget for added peace of mind.

Should your equipment ever fail, our service team includes divers who can get to the bottom of the matter, literally, performing repairs and replacements as needed while we inspect your entire installation to detect and prevent future problems.

Project expertise at a glance

As the technological leader in the water treatment industry, Xylem has answered the call for some of the world's largest power generators. And through the combined benefits of cost effectiveness, reliability and environmental responsibility, the power industry has come to rely on our expertise to solve some of its most difficult challenges. The following examples highlight some of our recently completed power projects.



Vietnam, Vung Ang 1 Power Plant

- **Plant type:** Coal fired power plant, 2 x 600 MW
- **Challenge:** Install sea-to-plant intake system to filter uninterrupted cooling water supply. System to remove encountered debris, preventing condenser blockage. Intake channels to permit isolation for preventive maintenance.
- **Solution:** A two-stage intake system with course screening bar racks cleaned by automatic grab rake and fine stage provided by dual flow traveling water screens with filtered spray water system. Integrated automatic controls allow unmanned operation of both stages. Channel isolation for maintenance addressed with stop logs.
- **Results:** A complete system has been delivered and installed awaiting plant completion to go on line. Once fully operational the Vung Ang 1 power plant is plannedto be the largest of its type in the country supplying over 7.00 billion kWh a year to the Vietnam national grid.



Indonesia, Tanjung-Jati B-extension Power Plant Units 3 and 4

- **Plant type:** Coal fired power plant, 2 x 600 MW
- **Challenge:** Develop solution for bio-fouling control preventing marine growth in cooling water circulating system.
- **Solution:** On-site generation of hypochlorite using seawater and dose-to-seawater intake continuously at low concentration.
- **Results:** Electrochlorination system that produces 460 kg/hr of sodium hyperchlorite.



Saudi Arabia, Marafiq Yanbu Power Plant

- **Plant type:** Oil fired power plant, 2 x 250 MW
- **Challenge:** Boilers required demineralized water essentially free from Total Dissolved Solids (TDS) in order to perform without corrosion, scaling or fouling.
- **Solution:** Three mixed-bed demineralizer systems to polish desalinated water from the Red Sea to boiler feed water quality before being fed to the boilers.
- **Results:** All objectives met or exceeded: 3 x 80 m^3/hr (350 gpm) of demineralized water with conductivity <0.1 microS.







India, Raipur Super Thermal Power plant

- **Plant type:** Supercritical coal fired power plant, 2 x 685 MW
- **Challenge:** Reuse boiler condensate by removing metal oxides, trace ionic impurities and silica with condensate polishers.
- **Solution:** Six condensate polishers to treat over 3,100 m^3/hr (13,640 gpm) of return condensate. Exhausted resins are transferred to our external regeneration facilities allowing separation with minimal cross-contamination, ensuring consistent high-quality condensate and maximizing uptime through small to moderate leaks.
- **Results:** All objectives met or exceeded: polished condensate with conductivity <0.1 microS and low ppb levels of sodium, chloride, dissolved iron and copper.

USA, Duke Energy Belews Creek Station

- **Plant type:** Coal fired power plant retrofitted with FGD system, 2,240 MW
- **Challenge:** Use of wet Limestone-Forced Oxidation (LFSO) scrubbers in Flue Gas Desulphurization (FGD) systems to meet emission standards results in a purge stream that is acidic, supersaturated with gypsum, contains high TDS and Total Suspended Solids (TSS), heavy metals, chlorides and magnesium.
- **Solution:** A physical/chemical treatment combined with a biological process that utilizes selected strains of bacteria residing in a series of granular activated carbon filled bioreactors for the selenium reduction. Xylem scope also included operation and maintenance for the FGD wastewater treatment plant.
- **Results:** All objectives fully met or exceeded: 135 m^3/hr (600 gpm) of treated FGD wastewater with <1 ppb of mercury and <100 ppb of selenium.

USA, Combined Cycle Power Plant

- **Plant type:** Combined cycle power plant, 628 MW
- **Challenge:** Reduce freshwater consumption and eliminate water discharge from combined cycle plant. Achieve Zero Liquid Discharge (ZLD).
- **Solution:** An integrated membrane makeup and ZLD system consisting of 3 gpm potable water treatment system, 300 gpm make-up water treatment system and 300 gpm wastewater treatment/ water recycle system.
- **Results:** Due to the virtually all-membrane design, system exceeded expectations with overall recovery of >95% (while discharging minimal wastewater to evaporation ponds and trucking solids off-site). Design overcomes shortcomings of conventional approach/thermal design, with lower capital and operating costs.

Xylem |'zīləm|

1) the tissue in plants that brings water and nutrients upward from the roots.
2) a leading global water solutions company.

Xylem is a leading global water solutions company dedicated to advancing sustainable impact and empowering the people who make water work every day. Xylem connects diverse capabilities and innovative technologies to provide tailored solutions across the entire water cycle. From moving, treating and measuring water to optimizing and maintaining water systems, Xylem collaborates with customers to solve their most critical challenges. Together, through partnerships with utilities, industrial manufacturers, building operators, and communities, we are building a more water-secure world.

For more information on how Xylem can help you, visit xylem.com.

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