

competences

Water & Wastewater: Increase your efficiency and ensure compliance

Water is our life





Your challenges are our mission

Our founder George Endress always used to say: “First serve, then earn!” By that he meant, we must meet the challenges of our customers to be successful. This mantra still leads us today. That’s why our offering of products, solutions and services is targeted towards your specific challenges. In the water and wastewater industry, three challenging topics come to mind: water safety, plant efficiency and project optimization.

Water is essential for all life. That’s why it is so important to have access to clean and safe water. However, this is not a matter of course for everybody. The World Health Organization (WHO) estimates that 2.1 billion people lack safe water at home. Even with water treatment processes in place, challenges for operators are growing and legislation regulations are becoming more strict. New processes such as the removal of micropollutants are becoming the standard.

Although it is the primary task of every water plant operator to ensure water safety, they also must keep the overall costs in check. This means finding ways to make their processes more efficient without compromising the safety of the treatment. And with energy becoming more and more expensive in many different countries, this means striking the balance between safety and efficiency has never been more challenging.

With regulations for water treatment becoming more demanding, the treatment processes are naturally becoming more complex, resulting in the need of tighter process control. This makes planning a new plant or modernizing an existing one more demanding as more measuring instruments have to be selected and installed. Not to mention that budgets are getting smaller and timelines shorter.



2,1 billion people globally lack safe water at home



Up to **30 %** of energy within a wastewater plant is spent on aeration



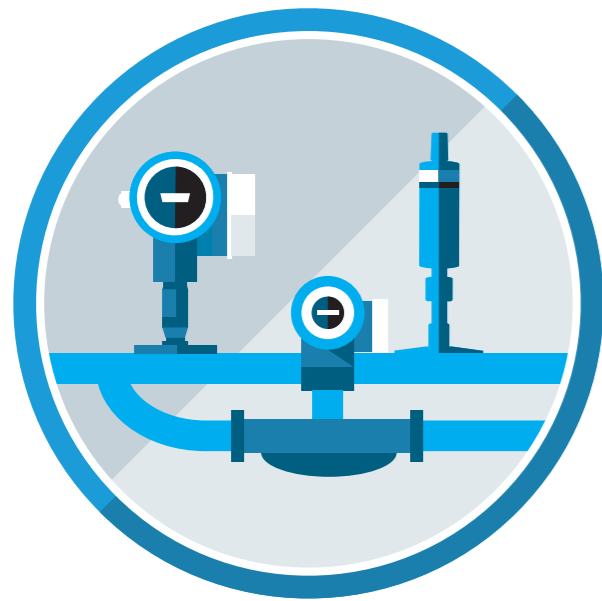
30 % loss of CAPEX and time in your process automation project using the traditional approach, according to project experts

Water is our life

Increase your efficiency and ensure compliance with an experienced and trusted partner

Legal demands, shrinking budgets and increasing process complexity: the challenges faced by the water & wastewater industry have never been greater. To master these challenges you need a partner who combines extensive industry knowledge and experience with an entire portfolio of products, solutions and services. Whether you need to update your instrumentation to comply with legal requirements, improve efficiency or

streamline your planning processes – rely on us and the experience we have gained working with our customers from all over the world. Based on those experiences, we have developed our entire instrumentation portfolio with the requirements of your industry in mind. This also applies to our solutions and service offering.



Customers around the world gain a wealth of information from their processes by using our **products, solutions and services**



Relying on our **industry knowledge and skills**, we work together with our customers to find the best solution for every application



As a family-owned company since 1953, we are a reliable partner in every aspect – **for our customers, employees and shareholders**

 Want to know more about our water industry expertise? Then visit us on www.endress.com/water



Protect our water

Ensure legislative compliance and water safety by relying on precise instrumentation and quality management solutions.

- Complete instrumentation portfolio
- Industry expertise
- Improved risk management thanks to service solutions
- Maintenance, calibration and verification services



Pump up your efficiency

With better maintenance routines and optimized processes, you can improve your plant performance and reduce operational expenditures (OPEX) up to 30%.

- Automation solutions to reduce costs
- Optimized maintenance
- Reduced spare part costs thanks to our modular instrumentation platform



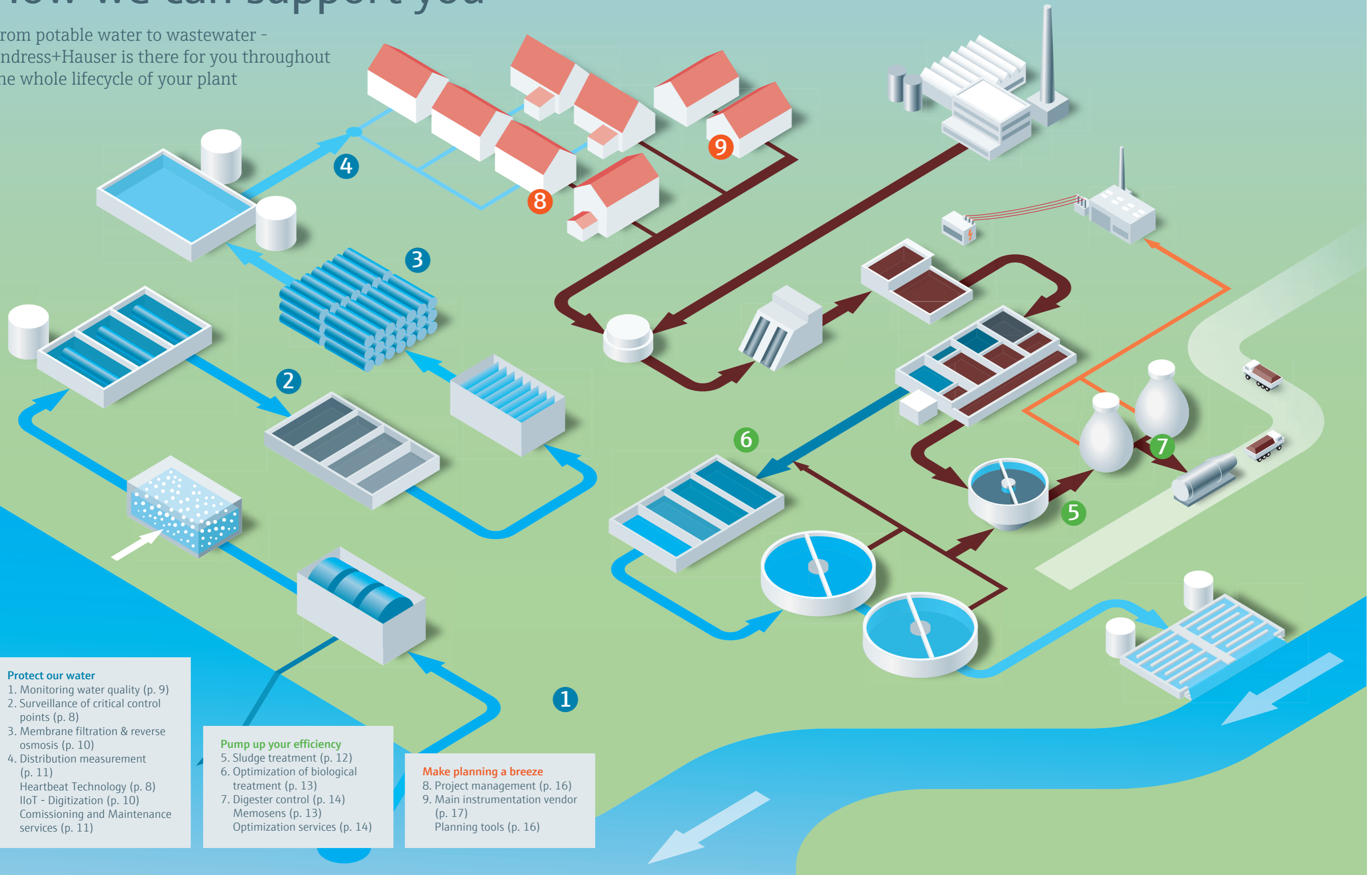
Make planning a breeze

With our entire instrumentation portfolio and certified project management skills, you will be able to streamline the engineering and designing process.

- Project management skills
- Reduced project complexity thanks to our broad portfolio
- Easy commissioning

How we can support you

From potable water to wastewater - Endress+Hauser is there for you throughout the whole lifecycle of your plant



Protect our water

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- 2. Surveillance of critical control points (p. 8)
- 3. Membrane filtration & reverse osmosis (p. 10)
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Pump up your efficiency

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Make planning a breeze

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Protect our water

Ensure legislative compliance and water safety by relying on precise instrumentation and quality management solutions

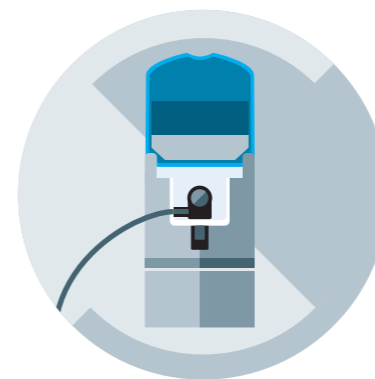
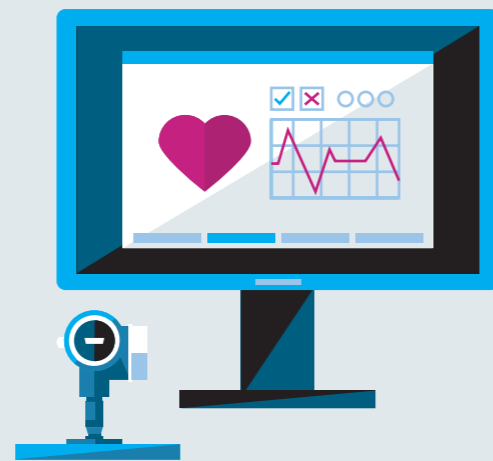
Surveillance of critical control points

The World Health Organization's Water Safety Plan defines various **critical control points** within the potable water treatment process that are essential for safe drinking water. These include chlorine measurement after disinfection or the inlet for membrane filtration. Thanks to our broad instrumentation portfolio, Endress+Hauser can cover all your critical control points without raising the complexity of your instrumentation. Our portfolio fulfills the requirements and regulations enforced by the World Health Organization. Document management, measuring point verification and maintenance strategies are attained thanks to online connectivity and self-diagnostic technologies, such as our **Heartbeat Technology**.



i Heartbeat Technology

Thanks to the Heartbeat Technology, measurement points can be easily verified without interrupting your processes. As the devices continuously diagnose themselves, test cycles can be extended. The self-diagnostic functions of our instruments not only increase the reliability and safety of critical control points, but also support your documentation by automatically generated reports. These reports provide precise instructions for necessary maintenance procedures. Furthermore, the process and device parameters can be used to optimize your maintenance efforts and your processes.



Up to 12 different parameters can be measured with our container solutions for mobile and remote sampling when equipped with Memosens sensors

Monitoring water quality

To protect natural bodies of water, the effluent of wastewater treatment plants must be controlled and the water quality must be continuously monitored. This ensures the water is safe for consumption and can be utilized as a potable water resource. Endress+Hauser offers **customer-specific panel and container solutions**, which include standalone measuring points with independent power supplies, remote data querying and integration of third-party suppliers.



More than 300 million people rely on the water produced by desalination plants according to the International Desalination Association (IDA)

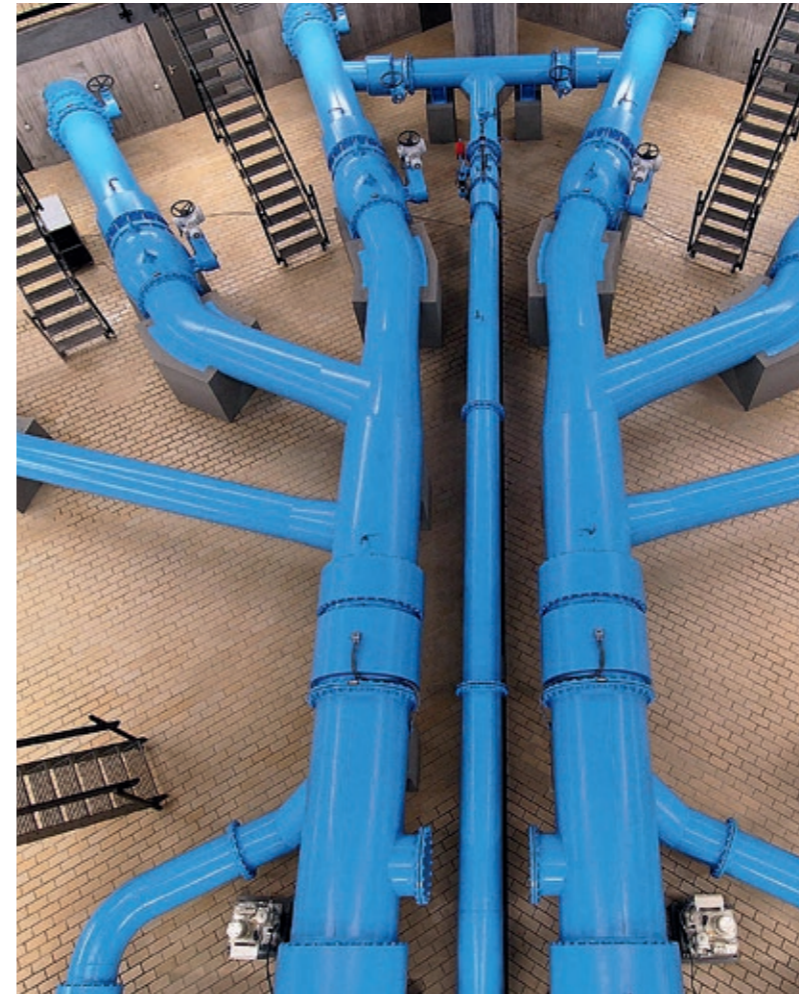
i IIoT – Digitalization

The Industrial Internet of Things (IIoT) is one of the hottest topics in the water and wastewater industry right now and you can take the first step towards this digital future with Endress+Hauser. Thanks to the online connectivity of our products even difficult to reach measurement points can be monitored and calibrated easily. For a comprehensive overview, we can provide you with dashboards that visualize your most important measuring points. In connection with our smart sensors and their self-diagnostic functions, the dream of the digital water plant is already becoming a reality.



Membrane filtration & reverse osmosis

Salt water desalination, water reuse and other modern water treatment methods have benefited from the development of membrane filtration. Product safety and reliability are the two main goals in membrane filtration water treatment operations. Mechanical protection is monitored mainly by **pressure and differential pressure**. Pressure devices in this application must deliver long-term, reliable measurement with low drifts. Due to probable pressure peaks, a high pressure overload resistance is required. Scaling and fouling processes can be reduced by accurate **quality monitoring** at the inlet with our analytical panels.

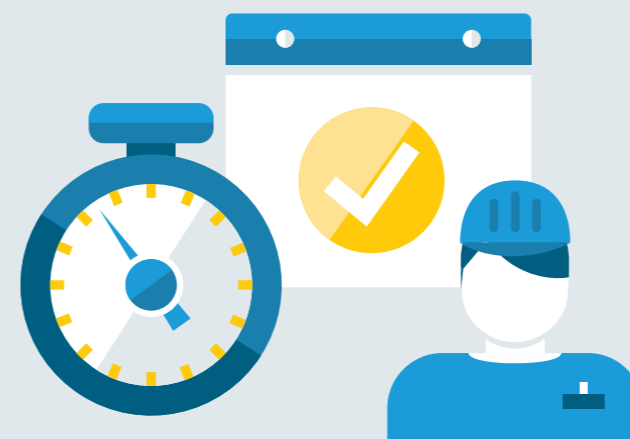


Distribution measurement

To make sure there is no contamination, water quality needs to be checked in the distribution network. Endress+Hauser **analytical panels** can be outfitted to meet our customer's individual needs to measure various quality parameters like turbidity or pH value. **Pressure and flow** measurements need to be closely monitored as well to identify potential leaks. One of the main challenges of flow measurement is recalibration. Oftentimes, calibration involves the removal of the flowmeter. This interrupts the process and increases downtime. With Heartbeat Technology embedded in the flowmeter you are able to minimize downtime. And with so many pressure measuring points in different measuring ranges, Endress+Hauser offers the perfect solution for reducing complexity and simplifying replacement part stocks.



48.6 billions of m³ are lost annually during water distribution according to a study done by the World Bank



i Commissioning and Maintenance services

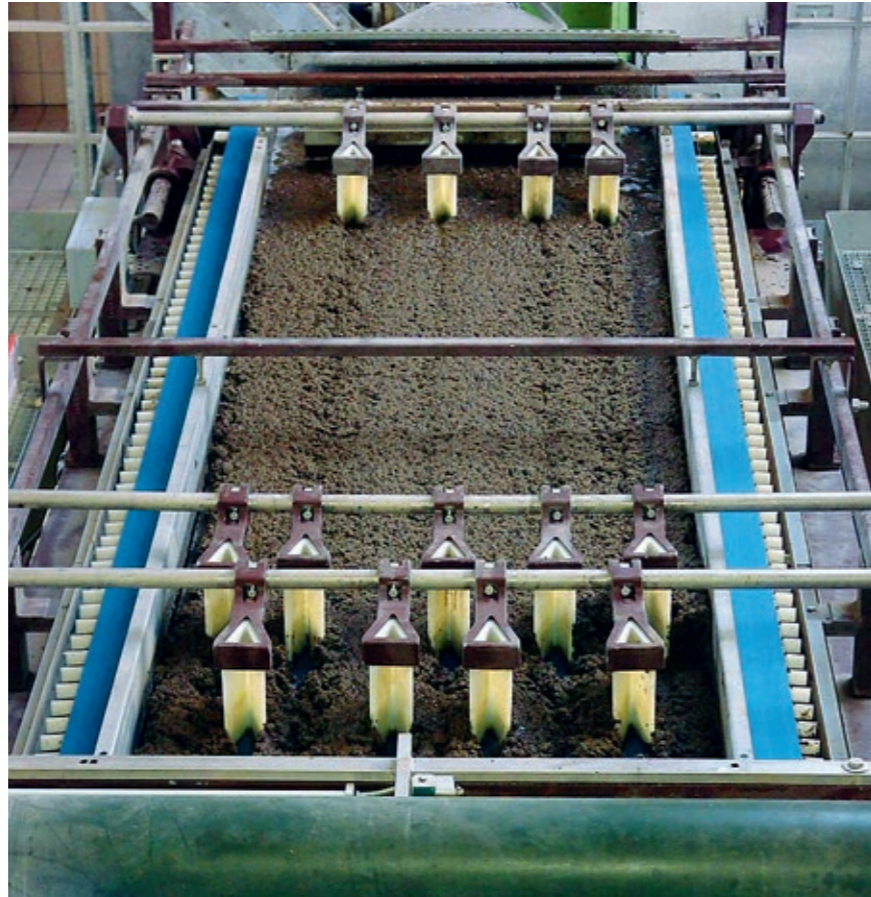
When it comes to critical control points, operators have to make sure the instrumentation is properly installed so they can rely on the measurement. All of our service experts have the necessary expertise and experience to integrate the instruments into your processes safely, ensuring compliance to regulations and standards. Once the instruments are installed, they will have to be maintained to operate accurately. Our service experts can support you with maintenance to ensure the continuous performance of your instrumentation. By relying on us, your maintenance personnel can focus on your core processes.

Pump up your efficiency

Improve your plant performance and reduce operational expenditure (OPEX) up to 30% through better maintenance routines and optimized basic processes

Sludge treatment

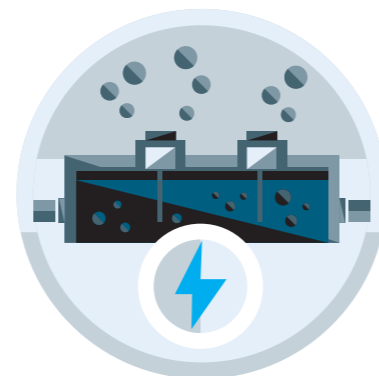
Sludge treatment is one of the biggest challenges the wastewater industry faces, as the disposal of sludge is expensive. Therefore, it is common practice to **dewater sludge** by conditioning it with lime milk or polymers. To optimize the consumption of chemicals, the chemical flow rate is measured as well as the solid content of the sludge, this achieves a load-based dosage. Usually, an optical sensor is used for this task. However, this does not work with very dark sludge. For these cases we recommend using a **coriolis flowmeter**, which can measure both flow rate as well as density.



Up to 25% longer filter life thanks to better sludge dewatering results



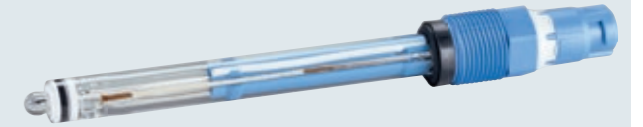
Up to 20% of cost savings due to reduced consumption of conditioner chemicals



Up to 30% of the energy costs in a wastewater treatment plant can be saved by using our solution for aeration control

i Memosens - the solution for critical measuring points

The Memosens technology, for liquid analysis, is based on smart-digital sensors with integrated data chips. The digitalization of the raw data in the sensor's head makes it possible to achieve stable measurement and reliable data transfer, regardless of external factors, such as moisture and dirt, that may be an influence. The data chip in the sensor head stores all relevant, sensor-specific information such as calibration data and history. Therefore, calibrating the sensor can be done under optimum conditions in the laboratory and they can be regenerated. This simplifies calibration and lengthens the sensor's service life.



Optimization of biological treatment

The biological stage of wastewater treatment, which includes **aeration and phosphate precipitation**, has become a standard in many treatment plants. It also offers a major potential for cost optimization. For example, up to 60% of the total energy consumed are spent on the aeration process. These costs can be lowered by using a **load-dependent control approach** without endangering effluent quality. We offer a PLC solution that optimizes the operation of the blower according to oxygen and nitrogen values. It also controls the precipitant dosing pumps based on the load which leads to reduced expenditures on chemicals. This solution can be easily integrated and is very flexible. As a main instrumentation vendor (MIV) we can provide you with all necessary sensors.

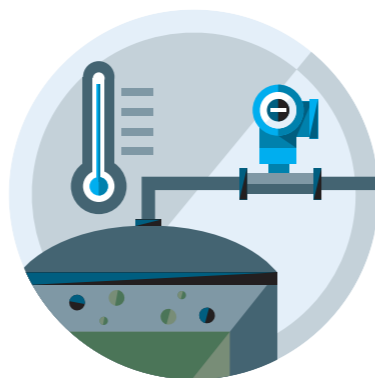
Digester tank control

Digesting sludge in tanks not only **reduces the amount of sludge** but also produces **biogas** which can be used as an energy source. However, process control is difficult because of the challenging conditions. Foam, for example, must be avoided to prevent downtime but is hard to detect. We recommend using two level devices: one hydrostatic sensor that measures the water column from the ground up and one radar sensor that detects the surface from the top down. In the event of foam generation there is a difference between the two values and anti-foam measures can be implemented. Another challenge is measuring the methane content upstream which is the first indicator for the anaerobic process. Because of the wetness of the biogas detecting the methane has been very difficult in the past. With our **ultrasonic flowmeter** methane can be safely and reliably recognized.



i Our services for safe and efficient processes

Our dedication towards improving your processes does not end with the delivery or commissioning of a new sensor. Our worldwide service offering supports you during the whole lifecycle of your plant. Apart from quick technical support we also offer calibration and maintenance services so that you can always rely on your measurement instrumentation. Our experts can recommend maintenance routines and with innovative tools such as our lifecycle management software (W@M) or our Installed Base Analysis application can enhance maintenance service.



Our flowmeters for wet biogas measure both volume flown and the methane content of up to **80°C** and gas pressures of up to **10 bar**



i Always at the forefront of technological development

Endress+Hauser takes pride in being one of the most innovative companies in the process automation market. As of now we own more than 7,000 patents and patent applications. The company reinvests approximately 7% of overall sales into R&D. We also support and partner with other innovative institutions and companies. For years we have collaborated with various universities all over the world. Another example is our preferred partnership with the Dutch company Royal HaskoningDHV that has developed the Nereda® wastewater treatment process. It purifies water using the unique features of aerobic granular biomass. It requires a quarter of the area of conventional activated sludge installations and can reduce the energy-costs by up to 50%.

Make planning a breeze

Streamline your engineering and designing processes with our instrumentation portfolio and certified project management services

Smooth execution thanks to project management expertise

Our employees can be an asset to your team for many reasons. One reason is because they are dedicated **industry experts** who are familiar with specific challenges and regulations of the water industry. Another reason is our **project management service**, based on the PMI framework, that ensures professional communication and collaboration between project stakeholders. The third reason is that early engagement, integrated teams and clear communication result in **lower costs** and **less risks** for your projects. Why? Because during the initial planning phase different technical solutions can still be discussed. This way, last-minute changes can be prevented and you can be rest assured that the best-fit technology is chosen right from the beginning.



i Planning tools that will make your life easier

We offer intelligent tools that support you during all project phases. Starting with "Applicator", a software that helps you to quickly find the 'best fit' instrument for your task. You can access it via our website or download it to your computer. With it you can determine the most suitable product and measuring technology for your industry. It also allows you to dimension your measuring points to prepare further purchase. And our web based "W@M" portal gives you even more insights to support your engineering during the whole lifecycle. It provides you with documentation of all processes and instruments such as 2D & 3D models and hook-up drawings. The recorded engineering data will help you with commissioning and maintenance.



Reduce project complexity by relying on a main instrumentation vendor (MIV)

The main challenge of project management is finalizing the project **on time** and **within budget**. But using multiple measurement instrument suppliers makes any project naturally more complex. With Endress+Hauser as a MIV all instrumentation from measurement transmitters to gauges, and accessories to services, will be provided in a comprehensive deliverable. After the project is finalized you can still rely on Endress+Hauser. The comprehensive **MIV approach** reduces the interfaces and gaps that occur during operation when having multiple suppliers. For example, you can save time thanks to documentation that is easily accessible and reduce costs with **simplified procurement**, storage and MRO processes.

References



Increasing safety efficiency in a wastewater treatment plant

Customer challenge:

The inlet of this wastewater treatment plant is variable due to industrial high load wastewater. The manual dosing of flocculants was not enough to maintain the concentration of phosphate in the outlet under the official limit of 1 mg/l P total. The customer challenge is to respect the official outlet limit of phosphate and manage the chemicals' costs efficiently.

Our solution:

The best way to reach this goal was to implement an automation system for chemical dosing which is based on phosphate measurement - in the outlet and in the inlet. The automation system (Liquicontrol-P) of Endress+Hauser was the only system who was able to measure both points:

- By using the inlet phosphate concentration the algorithm defines the "stoichiometric" quantity of flocculants.
- By using the outlet phosphate concentration a predictive regulator increases or decreases the previous quantity of flocculants in order to follow the set-point that the customer can freely define for the outlet (in our case 0,8mg/l).

Customer benefit:

- Savings of 26.000 €/year worth of flocculants (PAC)
- 2% reduction of sludge production
- Even with a peak of phosphate in the inlet, the outlet was under the official limit each time

New distribution control system for water supply

Customer challenge:

The municipality of Baltschieder has two reservoirs with a total volume of 1,000m³, and a turbine house for recovering electrical energy from the flow of spring water into the reservoirs.


The local council wanted to have a modern distribution control system in order to reliably monitor and automatically record and document the water retrieved and consumed from the water facilities.

Our solution:

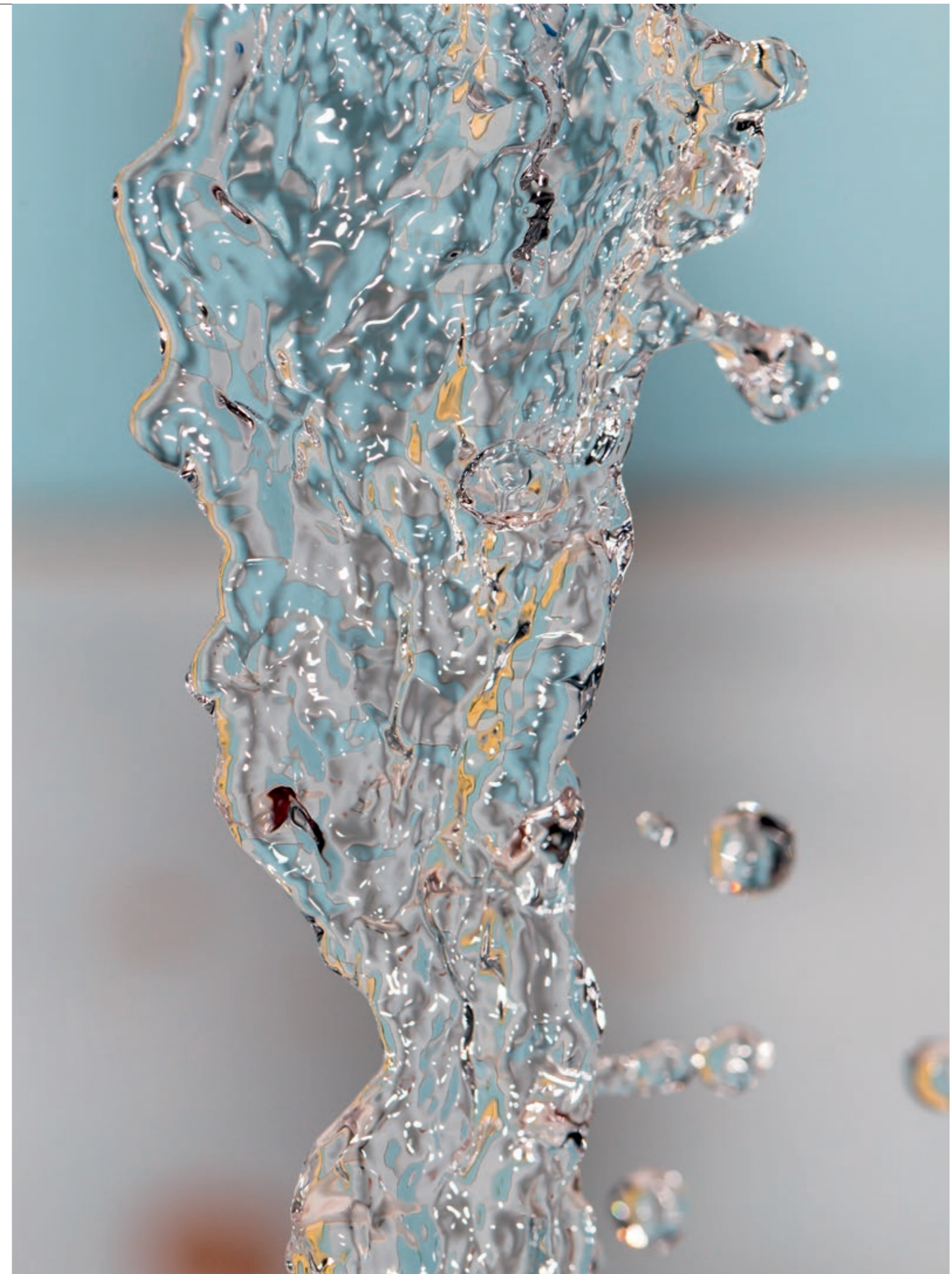
As a complete supplier for process automation, Endress+Hauser supplied the measurement devices, hardware and software engineering for the remote stations and the control center. The necessary cabinets with integrated programmable logic controllers and operating panels, the commissioning, training and all required documentation.

Customer benefit:

- Precise monitoring of water catchment and consumption and reliable documentation of these values
- Information is available via the Internet and stored in a database
- Faster reaction time and overall improved efficiency

 ... and how can we help to improve your processes?

Visit us at www.endress.com/water



www.addresses.endress.com

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