



**SIEMENS**

# Completely Committed to the World's most precious Resource

Solutions for Greater Efficiency in the Water and Wastewater Industry

Process Instrumentation

[usa.siemens.com/water](http://usa.siemens.com/water)





# Technologies for our future

Less than one percent of all the water on our planet is accessible and usable for domestic and industrial purposes. In view of the GROWING GLOBAL POPULATION and increasing URBANIZATION, it is therefore vital that we find NEW WAYS of using our limited resources of drinking water more sustainably and more efficiently, and of using new technologies to make existing water resources potable. The same applies to the treatment of wastewater, as 80% of municipal sewage currently flows untreated into our rivers, lakes and seas.



# Securing supply and disposal – at a sensible cost

## The right partner you can depend on

When it comes to our most precious resource, cost is obviously important. But it is equally vital that improvements are made in the way existing water resources are handled, in collection, in disposal and in transportation. For example, we always look at the entire value chain and add a range of levers to improve efficiency. And in doing so we fulfill diverse requirements – after all, limiting efficiency to costs alone misses the point.

Desalination, transportation, treatment, distribution? Products from Siemens help you to keep control of costs, improve your service quality and increase plant availability. The latter is important for sea-water desalination plants, as in many cases there are no alternative ways of obtaining drinking water. Nevertheless, the energy consumption of the plants is typically at the top of the agenda, as well as the energy used in transportation and in distribution networks. There are also key safety aspects, such as the fast localization and fixing of leaks. In the case of wastewater treatment plants, our innovations are led by the direct impact that energy efficiency and performance can have on costs. The more efficient all of the plant's processes, the smaller (and less costly) the plant can be.

## Keeping an overview of the entire plant life cycle

Irrespective of its role in the value chain, the life cycle of a water-plant can be broken down into four phases: planning, engineering, operation and modernization. You have different requirements in each of these, and we can provide tailored solutions to match. We can supply proven concept modules and planning tools to make your planning job easier and reduce your costs. As a system integrator we can help you to reduce the project costs for engineering and hardware when fitting out the electrical systems of the plant, from control level to field level. During operation and modernization phases, you can rely on us to help ensure the efficient, secure and sustainable operation of your plants as well as maintenance and expansion in line with your requirements.



Support throughout all phases of the plant life cycle – a capable, innovative and all-in-one solution.

## Effective support from Siemens lets you focus on your core activities

Increasing international competition in the water and wastewater industries represents a major challenge to plant designers and operators. To SAVE TIME and MONEY, processes need to be simplified and run EFFICIENTLY in parallel. Integrated engineering with COMOS and SIMATIC PCS 7, the Consultant DVD and the Industry Library from Siemens offer outstanding solutions.



20%

shorter engineering time

COMOS and SIMATIC PCS 7 make your engineering consistent, and therefore more efficient

15%

shorter project time

The Industry Library and the SIMATIC Water Library Advanced guide you safely and quickly to the perfect plant

20%

shorter planning time

The Consultant DVD makes your planning efficient and secure, with templates and standards

## Integrated engineering with COMOS and SIMATIC PCS 7

With the right tools, you can execute your planning and engineering processes in parallel. COMOS, our engineering software solution, creates the foundation to let you do this. In COMOS, you only have to enter the engineering data once for it to be available to all of the planning processes at the same time; the risk of errors falls considerably. As a result the engineering activities for different systems can be done in parallel, and therefore completed earlier. What is more, only Siemens allows direct bidirectional exchange of data between engineering and the SIMATIC PCS 7 automation system. That not only speeds up your automation engineering, thanks to reports on changes during operation to COMOS, you also always have up-to-date documentation for your plant. In addition, COMOS lets you plan, manage and organize maintenance actions.

## SIMATIC Libraries

In SIMATIC PCS 7 Industry Library, Siemens has a function block library that provides efficient support to your engineering for the SIMATIC PCS 7 distributed control system and the SIMATIC WinCC visualization system. The tested, standardized components and intuitive operation will help you save money and benefit from economically efficient plant engineering. Thanks to the SIMATIC Water Library Advanced, you can work with preconfigured templates for water applications that help you avoid errors and reduce commissioning time.

## Tailored support with the Consultant DVD

The reliability and efficiency of water and wastewater plants, pumping stations and desalination plants depend on the configuration of the energy distribution and automation. Siemens has developed the Consultant DVD, an efficient toolset to support engineering and planning. The DVD contains all of the information needed during planning of the electrical equipment, as well as practical examples for configuring automation and energy distribution. More than 3,100 specification text modules provide real assistance when creating specification lists, while also increasing the quality. This is complemented by application manuals and relevant product information, and up-to-date quick links to the appropriate product web pages.

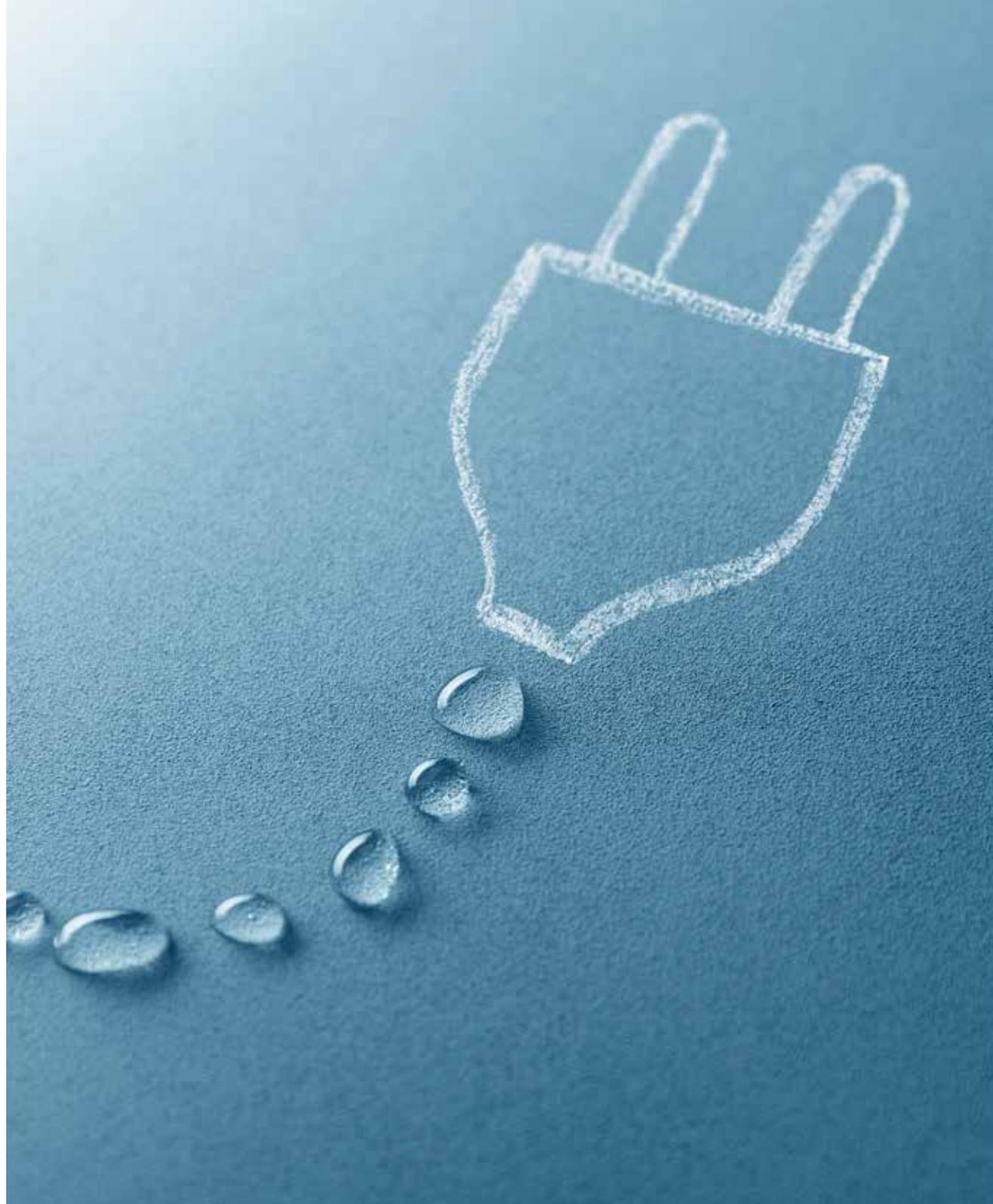
Planning phase → Engineering phase → Operation phase → Modernization phase

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## Sustainable use of resources helps save money and energy

**IDENTIFYING** and eliminating **ENERGY-INTENSIVE** components is a key challenge in optimizing water and wastewater plants. With the Energy Audit, SIWA Optim and energy-saving drives, Siemens offers a wide range of solutions.



Up to **15%**

Lower electricity costs

SIWA Optim runs all pumps at optimum efficiency, saving electricity

### Calculate the lowest energy costs: SIWA Optim

The scalable SIWA Optim management system from Siemens allows water-supply plant operators to minimize their operating costs by using pumps as efficiently as possible. Mathematical optimization processes are applied along with information on the energy supplier's tariffs to calculate the most economical pump, well and tank operating schedules while maintaining a secure supply. Similarly, timetables can be produced for a range of scenarios, such as operating in emergencies or during maintenance periods. Furthermore, SIWA Optim supports operators in selecting pump sets and ensures the optimum efficiency is obtained from all pumps whether fixed or variable speed.



Up to **70%**

Electricity savings

Energy-saving drives from Siemens make water and sewage transportation much more economical

### Our drive – your profit

In the water industry, pump, ventilation and compressor applications demand totally reliable, efficient drives. A significant factor in your operating costs is the availability of drives, which Siemens tests for resilience under realistic conditions on an ongoing basis. The Siemens portfolio of motors and frequency converters for the water industry comprises low- and medium-voltage drives with output from a few Watts up to the high double-digit megawatt range – particularly beneficial when you have perfectly matched converters and motors, which we develop and manufacture in close cooperation.



**100%**

Transparent energy consumption

Energycheck uncovers potential that you simply cannot ignore

### Less electricity, less CO2, less expenses

Founded on its own sustainability success story and more than 15 years of experience in consultancy, Siemens also offers its Energy Efficiency Services for the water industry, under the name Energy Audit.

These services help plant operators to retain transparency over their energy costs. Energy Audit is a three-stage plan to obtain maximum energy savings, taking you from an energy check and analysis of savings potential through the drafting and action plan, to implementation. As a result, the Energy Audit gives you a tailored energy supply plan, including a calculation of all of the technically and economically sound options – the perfect basis for your management decisions.



## End-to-end automation improves process quality and increases plant security

The primary concern in the water and wastewater industry is SECURITY OF SUPPLY, ensuring that a reliable supply of water is provided whenever and wherever it is needed, in the right volume and quality. Major factors in ensuring this are PLANT AVAILABILITY and PROCESS SECURITY. Siemens gives you the technical tools you need to achieve it.



100%

Monitoring of critical systems

The Siemens Industrial Security solutions prevent unauthorized access to your processes

## Secure, right down to the field level

Modern water and sewage systems are usually connected to the Internet for monitoring and control purposes. A facility that gives you greater transparency and flexibility also means that your internal processes, which were previously protected, are now exposed to the risk of attack from outside. A further danger is found in the use of external data media, which can carry viruses. The Siemens Defense-in-depth concept provides protection at three levels: plant security (e.g. entry control), network security (e.g. using firewalls) and access security (e.g. by authenticating and authorizing specific users). This gives you complete protection against external access.

Planning phase → Engineering phase → Operation phase → Modernization phase

100%

Online collection of remote data

The ability to keep an eye on all remote stations at all times lets you optimize your plant control process

## Control and optimize remote stations from your control room

To ensure secure control of water and wastewater plants, with their often extremely large area and distributed structure comprising numerous remote stations such as water towers, pumping stations and storm water tanks, it is vital that all plant components are connected to a single, unified control system such as SIMATIC PCS 7. Siemens offers a complete portfolio of RTUs (Remote Terminal Units) and supports all of the major data transfer protocols (IEC, DNP3 and ST7). You benefit from consistent process management, simple and user-friendly data management and consistent engineering for central and remote subsystems.

Planning phase → Engineering phase → Operation phase → Modernization phase

99,97%

SIMATIC system availability

Highest levels of plant availability, thanks to reliable products and expert knowledge

## Work better with highly available plants

Security of supply is dependent on the availability of your plant. Siemens Industry supports you with a range of services and measures. These include a consistent monitoring of all processes, with a comprehensive spectrum of measurement and automation systems that make processes transparent. Not forgetting the range of custom services for the water and wastewater industry that are essential for ensuring hitch-free operations. But as a reliable partner, Siemens can offer you more than tried-and-tested, reliable products: through us you have access to many decades of expertise in the industry, especially in solutions for ensuring the utmost plant availability.

Planning phase → Engineering phase → Operation phase → Modernization phase

# The reliable technology partner for your success



**We know all about the increased responsibility that comes from making a commitment to the water and wastewater industry – and we readily face that challenge: to be a trusted technology partner, offering services that help our customers achieve their goals, today and in the future.**

## **Life cycle engineering with COMOS**

COMOS is the only integrated software solution based on object orientation to carry out holistic plant asset management projects. The COMOS data platform provides plant design engineers and operating personnel with a consistent and continuous flow of data that meet their specific needs across all project phases and all enterprise levels. This enables you to assimilate planning and operating environments which results in more efficient workflows as well as higher productivity and quality.

## **The right control for your process**

SIMATIC PCS 7 ensures everything is in place for first-class process quality. High performance puts this process control system at the core of highly efficient plants. The distributed control system (DCS) handles the complete automation of all processes in the water industry, such as wastewater treatment plants from the intake to the outfall, including key-connected ancillary works such as combined heat and power plants. Widely distributed or remote systems such as pumping stations can be remotely controlled and monitored extremely efficiently, using the optional SIMATIC PCS 7 Telecontrol add-on. Thus, these distributed process sections can be fully integrated into a single, plant-wide process to optimize operations.

## **Process visualization with Plant Intelligence**

When it comes to process visualization, WinCC is the industry standard, both as an independent SCADA (Supervisory Control And Data Acquisition) system and as the HMI component for control systems such as SIMATIC PCS 7. Optional WinCC components or add-ons

allow the basic system to be adapted easily to the specific requirements of the water industry.

## **Software framework for automation**

The Totally Integrated Automation Portal (TIA Portal) offers an integrated Engineering Framework for controllers, HMI and drives. Alongside ease of programming, the benefits include reusability and analysis of project data, flexible machine configuration for custom solutions and fast access to online data.

## **Measuring and monitoring processes**

No matter what process data you want to collect, Siemens has the right process instrumentation for all applications in the water and wastewater industry. Levels, pressure, flow or temperature – our product range has the leading technology and gives you the data that you need. In addition, intelligent field devices can be operated, configured, maintained and diagnosed extremely efficiently with SIMATIC PDM (Process Device Manager), all integrated into SIMATIC PCS 7.

## **The standard – SIMATIC S7**

The SIMATIC S7-1200, S7-1500, S7-300 and S7-400 families of modular controllers from Siemens provide unique, proven control for all of your water and sewage applications. They are reliable, powerful and robust, and support many different complex requirements.

SIMATIC S7 modular controllers can be extended at any time using plug-and-play I/O, function and communication modules, so you can tailor them perfectly for your requirements.



### **Versatility: distributed I/O**

Gathering all of the relevant data from field devices is vital in ensuring the success of an automation solution. The Siemens SIMATICET 200 distributed I/O systems cover a broad range of applications for deployment in control cabinets, directly on machines or in hazardous explosive areas. Depending on the version, they can also integrate security and diagnostics, reporting diagnosis data to the control system via PROFIBUS or PROFINET with a minimum requirement for cabling.

### **Energy-saving and future-proof: variable-speed drives**

Our variable-speed motors with frequency converters have many advantages for the water and wastewater industry. As they only consume the amount of power that they actually need, they can achieve significant energy savings. In addition, they eliminate the typical current peaks and therefore also the mechanical shocks during start-up and controlled shutdown of your plant, extending the lifetime of all components. The key benefit, however, is the significantly greater accuracy of control with shorter response times in comparison with mechanical control systems (e.g. throttles), so that the flow rate can be adapted faster and more precisely when changes occur in demand. In this way our variable-speed drives optimize energy consumption and life cycle costs, while simultaneously improving the quality and reliability of your processes.

### **Complete control**

Communicative, industrial switchgear from the comprehensive Siemens SIRIUS range enables effortless, economic operation in water industry applications. The multifunctional SIMOCODE pro motor management system for low-voltage, fixed-speed motors provides all of the protection, monitoring and control functions you need in one device. And the SIRIUS soft starter reduces mechanical shocks when starting up pumps, for example, and minimizes harmful harmonics feedback effects. SIPLUS RIC (Remote Interface Control) supports

remote automation of water supply networks and sewage systems with standardized data transfer.

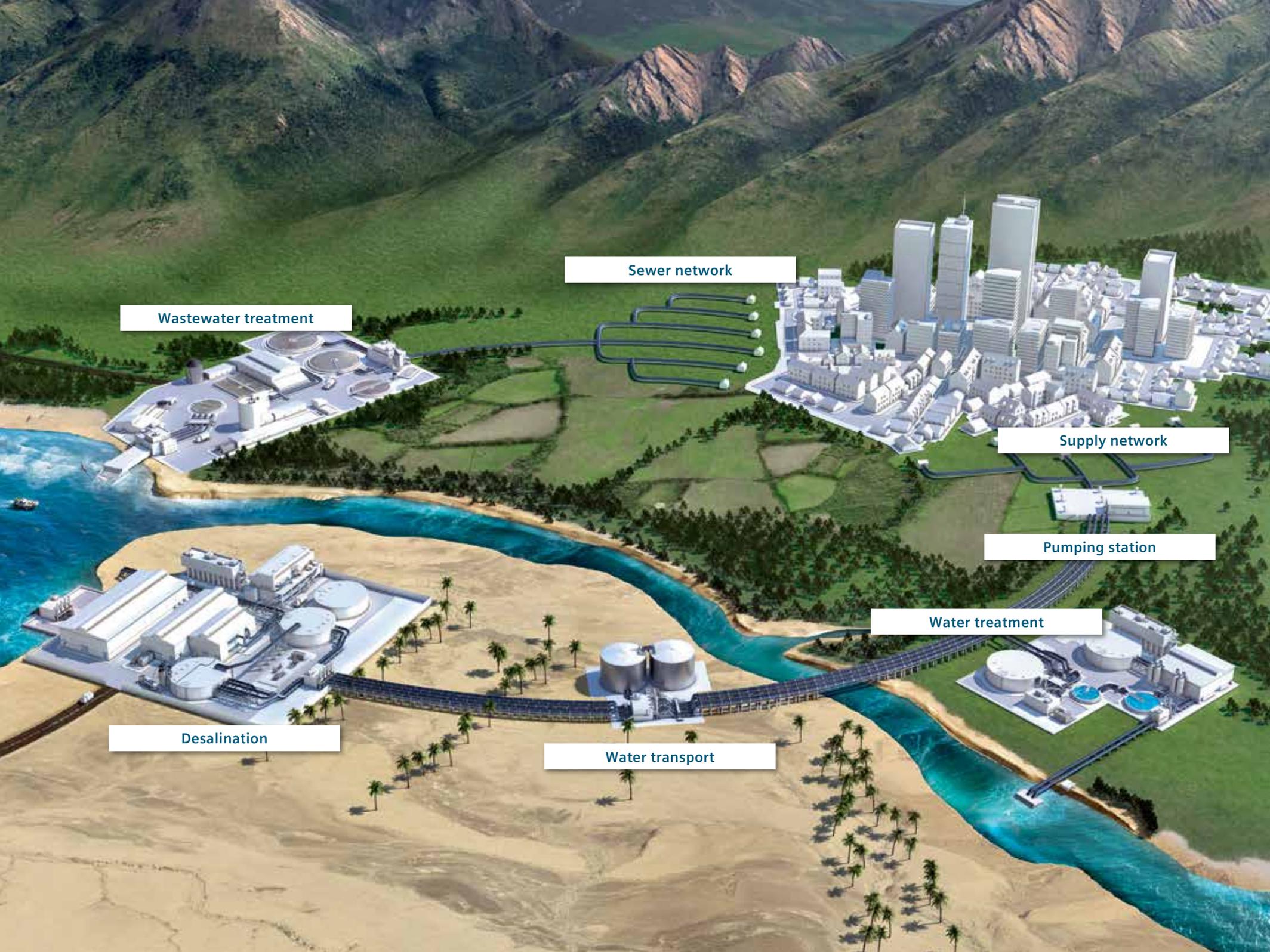
### **Intelligent electricity supply management**

A basic requirement in every water supply and wastewater management is a continual, secure and efficient electricity supply. Our type-tested SIVACON systems provide reliable technology (such as SENTRON circuit breakers), modularity and PROFIBUS DP or Ethernet communications. Meter values, switching statuses and triggers are then available to higher-level intelligent power-management add-ons such as SIMATIC PCS 7 powerrate and SIMATIC WinCC powerrate for analysis purposes and to achieve long-term improvements in energy consumption, quality and distribution availability. At the same time, they help reduce the overall energy demand and as a result bring down associated costs.

### **Tailored services**

In the water and wastewater industry, rising competitive pressures demand the highest levels of productivity at the lowest levels of energy consumption. Siemens offers a broad range of services to help optimize your plant to achieve this.

Lifecycle Services allow operators to optimize the performance of their plants, for example through staff training, maintenance based on the actual plant condition, and repair services, over the entire life cycle of the plant. Value Services are concerned with providing operators with added value by optimized operations monitoring, dike monitoring and measures to improve energy efficiency.



Wastewater treatment

Sewer network

Supply network

Pumping station

Water treatment

Desalination

Water transport

# Technology-leading solutions from Siemens – around the world

Today, drinking water and sewage services are global concerns that demand a partner who understands how to respond to a range of requirements and the needs of international customers. Siemens has proven its capabilities in numerous projects all over the world. We can only present a small selection here, please ask us for specific references that match your particular requirements.

## Desalination plants

Almost 95% of the water on our planet is saline, and cannot be used for drinking water or irrigation. The desalination of seawater provides an opportunity to obtain additional drinking water or water for domestic, industrial and agricultural purposes. Europe's largest plant in Valdelentisco in Spain uses the principle of reverse osmosis to capture 145,000m<sup>3</sup> of drinking water from the sea every day. Siemens electrical equipment and process control systems not only help to reduce energy consumption, but also maximize the security of supply.

## Drinking water treatment plants

In many regions of the world, groundwater alone cannot satisfy the demand for drinking water. As a result, the treatment of surface water or even sewage to make it drinkable is increasingly important, especially in countries with water scarcity or with rivers heavily polluted. In one of China's largest water treatment plants (Xiancheng, Suzhou), Siemens intelligent automation systems, drive technology, switching systems and energy distribution ensure smooth operation and 300,000m<sup>3</sup> of treated drinking water every day.

## Water transport and pumping stations

Long-distance water pipelines are a proven means of supplying water-poor regions with drinking water when suitable resources exist further away. In the capital of Azerbaijan, Baku, Siemens intelligent automation technology ensures that 75% of the two million inhabitants now have a constant supply of drinking water, compared with just 40% previously.

## Wastewater treatment

With its specialist software and automation technology for the industry, Siemens supports both state-of-the-art sewage plants and technologies for biological sewage treatment. For example, at the Czajka treatment plant in Warsaw, a SIMATIC PCS 7-based distributed control system was installed and the facility is now the most modern plant in Europe. With the ability to treat more than 300,000m<sup>3</sup> per day, Czajka improves the water supply of 2.1 million of Warsaw's inhabitants, as well as the quality of water in the river Vistula, the city's most important source of drinking water. Organica, one of the leading developers of biological treatment plants, also relies on Siemens automation technology. Organica wastewater treatment plants use green plants especially adapted to the local environment and the content of nutrients. The advantage is a smaller footprint, odorless operation under glass, minimized energy consumption and distributed sewage treatment plants close to the corresponding source.

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