

Addressing the World's Most Pressing Water Issues.

Communities and industry alike face serious challenges in ensuring an uninterrupted supply of high-quality water, while reducing the demand on fresh water supplies and meeting regulatory and environmental requirements. Siemens Water Technologies is working to help municipalities and industries around the world find sustainable solutions that reduce energy consumption, recycle/reuse water, minimize waste and reduce life-cycle costs.

Worldwide Employees	5,400
Global Locations	7 regional water hubs 17 global manufacturing sites
R&D Personnel	170
Global Service Network	120 branches
Number of Installations	More than 200,000
Technologies/Service Offerings	More than 900
Patents & Trademarks	2,100
Headquarters	Warrendale, PA, USA



Answers for the Environment

Urbanization and demographic changes pose serious challenges to secure water supplies for future generations. It is estimated that by 2025, one-third of the world's population will be affected by water shortages and by 2050, 60%. It is estimated there will be a 40% increase in water consumption by 2025. In addition, municipalities and industries are faced with the challenges of upgrading existing equipment to help reduce costs; better managing water resources; and complying with new regulations. Siemens Water Technologies offers solutions to meet these challenges.

- Siemens' membrane filtration and conventional technologies treat more than 2.5 billion gallons of water per day for water reuse and reclamation, helping reduce the demand on potable water sources worldwide.
- Our products and services can help customers retrofit, upgrade or expand their plant to solve aging infrastructure, population demands or impending regulations.
- Siemens' UV disinfection systems provide a safe and cost-effective alternative to chlorination.
- Siemens protects the world's oceans through 750 onshore and offshore produced water treatment systems, treating about 6 million barrels of water per day.

- Through the use of thermal reactivation, Siemens reduced the volume of spent carbon sent to landfill by over 36 million pounds in 2010.
- Siemens recycled more than 2.5 million pounds of ion-exchange resin in 2010, which resulted in metal recovery and reuse of resin, thus minimizing waste.
- Siemens' composting technology converts more than 500,000 tons (450,000 tonnes) annually of biosolids, source-separated organics, municipal solids waste and other organic residues into high-quality compost.
- Compared to an aerobic digester, the Cannibal process typically saves more than 90% in energy.

Industry Leading Advancements

- **Advanced oxidation.** Siemens introduced the VANOX™ point-of-use (POU) system for effectively removing total organic carbon (TOC) in POU ultrapure water treatment systems for semiconductor applications.
- **Biological Nutrient Removal (BNR).** Siemens' VertiCel™ process can be retrofitted into wastewater treatment plants that are facing new, more stringent BNR requirements and a need to conserve power. Power costs of the process are 20-30% lower than other BNR processes.
- **Chlorination.** Named one of the most significant technological advances of the 20th century by *Life* magazine, Siemens invented the chlorinator to disinfect drinking water in 1913.
- **Continuous deionization.** The first to commercialize the CDI® system, Siemens has more than 2,000 deionization systems in operation worldwide. Siemens continues to make improvements to its continuous deionization offering.
- **Dewatering.** Siemens acquired Industrial Process Machinery (IPM) in 2010, allowing Siemens to offer IPM filter presses worldwide and add to its mining solutions portfolio.
- **Double-pass RO.** Siemens developed the double-pass reverse osmosis (RO) technology, changing the way microelectronics manufacturers treat water.
- **Membranes for reuse.** Memcor® membrane systems are used worldwide to treat secondary and tertiary wastewater for reuse applications, such as irrigation and recreation and for industrial uses. In 1990, membrane technology from Siemens was used in the first municipal wastewater reuse installation.
- **Mobile water treatment services.** Siemens was the first to introduce mobile water treatment to the industry more than 35 years ago. In addition to North America, Siemens also offers mobile services in Europe, Middle East and Southeast Asia.
- **Wastewater treatment.** Siemens installed its first wastewater treatment equipment in the 1890s. It has since installed equipment at more than 26,500 treatment plants worldwide.

Innovation

Siemens Water Technologies has seven R&D centers and more than 150 people dedicated to R&D throughout the world. R&D scientists focus on waste reduction, energy and process efficiency, desalination and water reuse.

- Siemens' global R&D headquarters in Singapore is working on a full-scale pilot test of its membrane bioreactor (MBR) system at the PUB's Changi Water Reclamation Plant in Singapore. The 250,000 gpd/1,0 Mio liters/day MBR system treats domestic wastewater and allows testing of new innovative design parameters for Siemens' MBR system.
- Siemens is working on "green technologies" by demonstrating the feasibility of retrofitting large-scale treatment plants to approach virtually zero energy consumption, reduce CO₂ footprint and reduce sludge generation. Since June 2010, a pilot facility has been treating about half a cubic meter of wastewater per day, while operating in an energy neutral manner.
- Singapore's Environment and Water Industry Programme Office (EWI) awarded Siemens Water Technologies the first-ever Innovative Technology Challenge for developing an advanced desalination technology that would cut energy consumption by at least 50%. A demonstration plant was built, and since 2010, has been treating 50 m³/day of seawater at a PUB facility in Singapore. The new process reduces desalting energy by over 50% compared to best available technology. A full-scale system will be built by 2013.
- Siemens is developing a new micro-media column (MMC) based on a new filter media and flow design. The column removes contaminants such as selenium, chromium, mercury and arsenic down to parts per trillion levels. It will help municipalities and industrial customers meet new contaminant reduction regulations.
- Siemens' SiCURE ballast water management system has received Basic Approval from the Maritime Environmental Protection Committee of the United Nations' International Maritime Organization. This approval indicates that the process used in the SiCURE system is suitable with respect to the safety of the ship, its crew and the environment.
- Siemens is working with Aramco Overseas Company, B.V., a subsidiary of Saudi Aramco, to commercialize the EcoRight™ MBR system. The system is designed to meet very stringent wastewater discharge requirements, particularly for wastewater reuse. Siemens is currently operating a pilot plant at a Saudi Aramco refinery, where wastewater from the existing oil/water separator is being treated with the EcoRight system. The MBR effluent is then fed directly to a reverse osmosis system, to allow the water to be reused as boiler feed, cooling water and other process water. This can ultimately result in significant reduction in the use of valuable desalinated seawater and well water for the facility. The EcoRight system at the plant is exceeding expectations for reduction in oil, COD, TOC and other parameters. The EcoRight system will be commercially available before the end of 2011.
- Siemens has partnered with PERF (Petroleum Environmental Research Forum) to pilot test the Petro™ MBR system for viability in treating refinery wastewater.
- Siemens has reconfigured its Memcor CP membrane filtration product line to allow for reduced installation requirements and lower costs. The CP uses Memcor L20V PVdF ultrafiltration membranes to provide up to 50% more membrane area in the same footprint than previous pressurized module designs and to reduce equipment costs by up to 20%.

- Siemens' Forty-X™ disc filter is ideal for tertiary filtration, water reuse and process water filtration. It captures more solids in a smaller footprint with a pleated media design.

Efficient, Smart Solutions for Customers

Municipalities

Every day, Siemens delivers water treatment or services to hundreds of thousands of communities and individual homeowners worldwide.

- **Orange County, California, USA.** Siemens supplied one of the largest Memcor membrane systems ever to the Orange County Water District (OCWD) in California for its groundwater replenishment (GWR) project. The OCWD won the 2008 Stockholm Industry Water Award for its pioneering work. The District chose Siemens a second time in 2010 to provide a membrane system for the GWR expansion.
- **Thailand.** Siemens designed, engineered, manufactured, constructed and provided commissioning support for water and wastewater treatment plants at the Asia Industrial Estate in Rayong, Thailand, part of a Joint Venture complex being built by Dow Chemical, SCG and Solvay.
- **Perth, Australia.** Siemens is supplying a membrane filtration system as pretreatment for the Southern Seawater Desalination Plant in Perth, Australia. The Southern Seawater Joint Venture chose Siemens' Memcor membrane technology for its reduced system footprint, simplicity of operation, lower energy cost, and improved feedwater quality.
- **Wuxi, China.** Siemens' Memcor CP technology is treating tap water at Wuxi's Zhongqiao Drinking Water Treatment Plant.
- **Lebanon.** Siemens provided an IPS Composting System to the Union of the Municipalities of Tyre, Lebanon to help reduce unregulated municipal solid waste (MSW) dumping and the associated environmental and health risks. The composting facility efficiently treats MSW and green waste from a highly variable and contaminated waste stream.
- **The Netherlands.** In 2010, Siemens installed a Cannibal® sludge reduction system with phosphate removal at the Waterschap Zuiderzeeland's AWZI (WWTP) in Zeewolde, the Netherlands. This is the first system of its kind anywhere in the world.
- **Singapore.** The Sembcorp NEWater Plant (SNP) is a Design-Build-Own-Operate (DBOO) project executed by Sembcorp Industries, which signed a 25-year NEWater agreement with PUB. Siemens supplied the equipment and engineering for the membrane system that incorporates seven Memcor CP membrane trains. The Sembcorp NEWater Plant is one of the largest recycled water plants in the world, capable of producing 228,000 m³/d of NEWater.

Industry

Siemens serves more than 90% of the Fortune 500 manufacturing companies, including approximately 100,000 industrial customers.

- **Beverage.** Siemens provided comprehensive water management for a global soft drink producer's plant in Malaysia. The multi-million dollar project includes water and wastewater treatment and a service agreement. Siemens' solution offers the lowest total cost of ownership while allowing greater operating flexibility, as well as energy, water and chemical savings.

- **Microelectronics.** Siemens has supplied high-purity water and wastewater treatment systems for semiconductor applications worldwide. The VANOX POU system, for example, consistently reduces TOC levels to 0.5 parts per billion and treats seasonal variations of TOC in feedwater used in semiconductor processes.
- **Life Sciences and Pharmaceutical.** Siemens' technologies, equipment and services help hospital and university research centers, biotechnology and pharmaceutical companies reliably and economically meet their needs for the highest purity water. One customer is saving 57 million gallons of water and over \$350,000 per year by using Siemens' technology solutions.
- **Oil & Gas.** Siemens has installed equipment at more than 30% of the petroleum refineries worldwide. For instance, Siemens is supplying an integrated wastewater technology solution to the Presidente Getulio Vargas Refinery in Araucaria, Parana State, Brazil. The system will include API oil water separators, dissolved air flotation units, walnut shell filter units, and a Petro MBR system.
- **Power.** A condensate polisher package with external regeneration facility will treat condensate for two 660-megawatt super-critical boilers for a new power plant in India. The project, awarded to Siemens by Indian construction company Larsen & Toubro, involves design, engineering, fabrication, installation, testing and commissioning of the condensate polisher package. It is currently scheduled for start-up in April 2013.

Global Presence

Siemens Water Technologies has major business hubs in Australia, Brazil, China, Europe, Singapore, Saudi Arabia, and the United States. Eighty-five percent of the U.S. population, and most of the U.S. industrial bases, are located within 100 miles of a Siemens Water Technologies service branch. In addition, the company's global R&D headquarters is based in Singapore.

Siemens AG. Siemens is a global electronics and engineering company with about 336,000 employees worldwide. For over 160 years, the company has stood for technical achievements, innovation, quality, reliability and internationality.

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