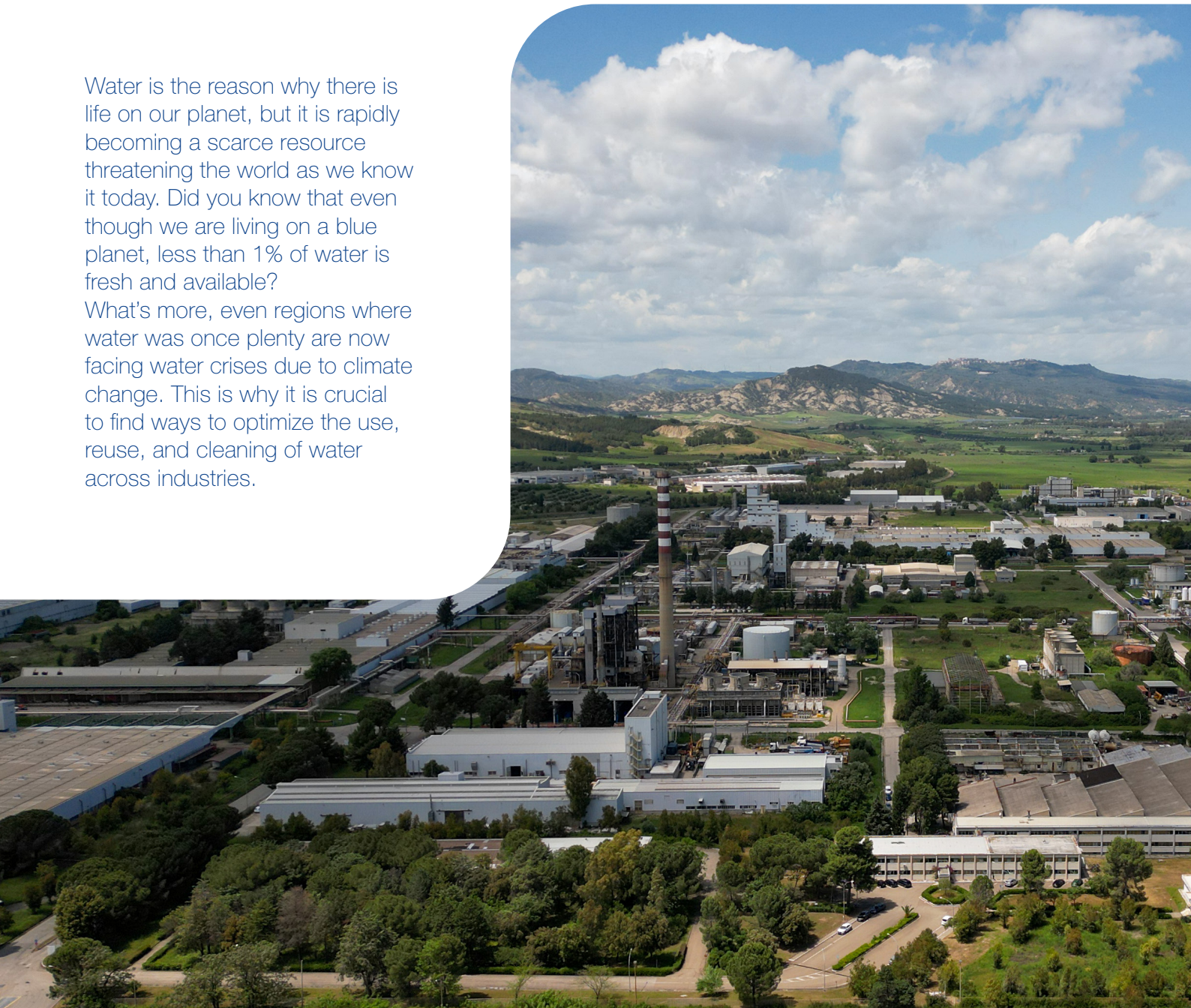
CASE STORY

Accelerating water circularity at Tecnoparco Valbasento

Tecnoparco Valbasento
Pisticci (MT), Italy

Water is the reason why there is life on our planet, but it is rapidly becoming a scarce resource threatening the world as we know it today. Did you know that even though we are living on a blue planet, less than 1% of water is fresh and available?
What's more, even regions where water was once plenty are now facing water crises due to climate change. This is why it is crucial to find ways to optimize the use, reuse, and cleaning of water across industries.



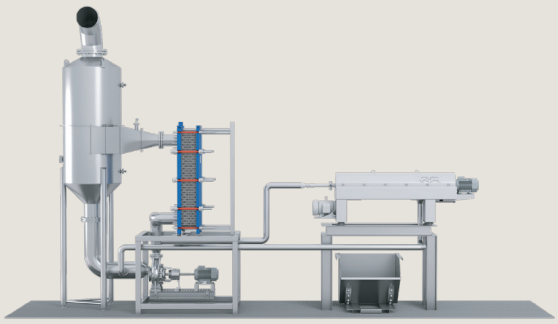
Providing energy while preserving the environment

Located in Basilicata, Tecnoparco Valbasento is a services and utility provider. It produces and distributes electricity, mainly from renewable sources, and thermal energy, technical gas, and industrial water to fuel business development in Val Basento while preserving the environment.The company's services include the treatment of wastewater coming from other sources as industries, municipalities, and private companies. In Tecnoparco, several kinds of processes are used based on the chemical composition of the wastewater. To achieve a treatment based on the best available technologies, the company has built new facilities for different kinds of treatment. The final goal was to reduce the environmental impact and to recover clean water to be used for other processes.The waste water (chemical, physical and biological treatment) is coming into a dedicated facility from companies in Val Basento industrial area, as well as the treatment of liquid waste from activities in the region and outside.

Tecnoparco Valbasento is in one of the most water-rich regions in Italy. Nevertheless, due to climate change, the region has recently experienced a water crisis. As a result, the water available was not enough to continue the activities that are normally carried out in this area. This is where the Zero Liquid Discharge System came into play, producing a water flow that enabled Tecnoparco Valbasento to seamlessly generate steam and keep all activities up and running.

ZLD (Zero Liquid Discharge)

Featuring the AlfaFlash evaporator and an optional decanter centrifuge, ZLD (Zero Liquid Discharge) systems efficiently remove solids from wastewater and other liquids. The process allows you to recover valuable dissolved and suspended materials to reuse or sell. You also obtain water that can be recycled and reused instead of being discharged, reducing disposal costs.



How does it work?

Water is fed into the AlfaFlash heat exchanger. After heating, the fluid is pushed through the flash orifice. The mixture is now essentially split into two phases – concentrate and vapour – which enter the cyclone separator where centrifugal forces boost vapour-liquid separation. Vapour rises towards the top, where mists and fine droplets are removed. The remaining concentrate flows into the recirculation pump. A side stream of concentrated liquid is then pushed through the decanter, where water is separated from solids. The boiled-off water is condensed and returned to the process for reuse so that no liquid waste is discharged into the environment.

The project

Industrial processes produce large quantities of wastewater that are crucial to clean and reuse in industry or other activities. This led to the idea of developing and setting up a system such as Zero Liquid Discharge.

To make this project come live, Tecnoparco Valbasento partnered with Hydros, an Engineering, Procurement and Construction (EPC) company for industrial and civil wastewater treatment plants. Hydros develops all the engineering activities in-house, including the construction and installation of the system.

The plant built at Tecnoparco Valbasento is unique in Italy and can treat industrial wastewater with a high pollutant load, recovering water and solids that can be reused. As by-products, the process produces salts that can either be reused or disposed of more efficiently. The entire liquid phase of the effluent is fully recovered and recycled in the same industrial hub for steam production, demineralised water supply or for other purposes.

The ZLD treatment system combines several technologies into a single treatment chain. Water is sent to the Alfa Laval system as reverse osmosis concentrate. The system is a two-stage evaporation plant where the liquid phase of the effluent is evaporated, and all the solid phase is concentrated into crystals. Then, the crystals are separated and extracted through a decanter, generally having a drying degree of over 95 per cent.

The plant treats approximately 9 cubic metres/hour of water using only 2800 kg/hour of low-pressure steam, which is very efficient.

Why ALFA LAVAL

Hydros goal was to build a plant using the best technology. The water treatment facility is based essentially on heat exchange technology, where Alfa Laval is a market leader.

Thanks to the collaboration between Hydros engineering team and Alfa Laval, Tecnoparco Valbasento developed an extremely high-performance and efficient plant. Going forward, the company is committed to a continued cooperation with Alfa Laval.

Benefits of ZLD

“With an Alfa Laval Zero Liquid Discharge system in your processes, you can clean and recover up to 98% of the water for reuse. This reduces your impact on the environment and your disposal costs. The systems are designed to separate heavy loads, even at levels where other technologies have reached their limits,” explains Samy Diab, Global Sales, Waste Water Evaporation and ZLD – Alfa Laval.

For more than a century, Alfa Laval innovative products and solutions have promoted energy efficiency, reduced emissions, and recovered water and waste.

9 cubic metres/ hour

of wastewater treated

2800 kg/hour

low-pressure steam used

Up to 98% water

recovered for reuse