Tinamar Textile Plant

Manufacturing

The Challenge

Tinamar first opened its doors in Barcelos, Portugal in 1989, providing dying and fabric finishing to customers in the apparel and technical textile industries. As Tinamar puts it, their business is “the pleasure of giving life and color” to fabrics.

In 2018, the company wanted to increase production capacity at its textile mill, but doing so would increase their electricity load, and local utility power was both extremely expensive and unreliable. Officials sought an alternative, distributed energy system that would free them from the challenges of the grid.

Partnering with Micropower Europe, Capstone’s distributor for Portugal and Spain, Tinamar installed an efficient combined heat and power (CHP) solution that not only reduced operational costs, it gave them increased efficiency and reliability, as well as the energy independence they had been seeking.

The Solution

Because the Tinamar plant has a high need for both electricity and steam, the installed cogeneration system was designed to provide both.

Adding to the plant’s energy demand is an energy-intensive water treatment process that requires plant operators to treat the water they use in the manufacturing process prior to introducing it back into the nearby Cavado River. Plant operators sought a scalable CHP solution that could be easily

Power Profile

Customer
Tinamar Textile SA

Location
Barcelos, Portugal

Commissioned
January 2019

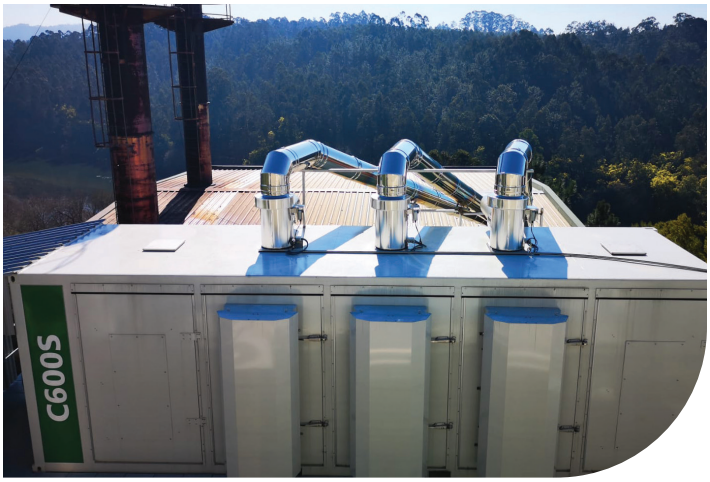
Fuel
High Pressure Natural Gas

Technologies
- 1 C600S Microturbine

Capstone Turbine Dealer
Micropower Europe

Thanks to the Capstone cogeneration system, the Tinamar factory has not only managed to reduce its costs but also improve their resiliency and environmental footprint.”

— Manel Blasco, CEO
Micropower Europe



To support an increase in production capacity, plant officials sought an efficient solution for their plant expansion. Rather than import more power from the local utility at extremely high rates officials installed on-site microturbine CHP solution.

expanded to accommodate the growing needs of the textile facility.

At the plant's heart is a five-bay C600 Signature Series microturbine that incorporates three 200 kW microturbines. The modular enclosure provides a long-term scalable solution with the capacity to be expanded from 600 kW to 1,000 kW without any change to the existing footprint, even as their power demands grow over time.

During the power generation process, exhaust gases are captured and used in a post-combustion boiler that allows the gas temperatures to be raised further and thus produce steam that is used in one of the production processes at the textile mill. By leveraging the exhaust gases, the plant is able to run its operations efficiently while reducing the amount of fuel it needs.

The Results

The Tinamar factory runs for approximately 6,000 hours per year. With the on-site power system generating 3,600 MWh/year, the microturbines successfully provide electricity for all manufacturing processes and facility needs. Thanks to the post-combustion boiler, the temperature of the exhaust gases of the microturbine can be increased to 600ºC (1,112ºF). This translates into a fuel savings of almost 2,000 MWh per year. Considering the electricity generation and the steam produced with the post-combustion boiler, the overall efficiency is over 75%.

Taking the efficiencies, electricity and fuel savings into consideration, the investment in the system will achieve payback in 5.5 years with an anticipated internal rate of return of more than 15%.

There are environmental benefits, too, as the system not only reduces fuel consumption, it makes use of exhaust gas that would otherwise be released into the atmosphere. For the textile mill, that would be the equivalent of removing 260 cars from the road.

"Thanks to the Capstone cogeneration system, the Tinamar factory has not only managed to reduce its costs but also improve their resiliency and environmental footprint," says Manel Blasco Busquets, CEO of Micropower Europe.

According to the International Energy Agency (IEA), Portugal renewed its Combined Heat and Power Directive in 2015, which focused on the promotion of cogeneration based on useful heat demand. The commitment aims to increase energy efficiency and security of supply by creating a framework for the promotion and development of high-efficiency cogeneration projects.

As one of the largest textile exporting regions of the world, the European Union is in a prime position to lead a distributed generation movement in this industry alone. A system like the one installed at the Tinamar plant can serve as a blueprint for other textile mills all over Europe, paving the way for others to improve their bottom line with energy efficient microturbines.

Capstone C600S Microturbine

A C600S Microturbine provides up to 600 kW of electrical power and contains three 200 kW microturbine engines.

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