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# BOOSTING ENERGY RELIABILITY AND EFFICIENCY

## With heat and power for the textile industry that meets stringent local emissions requirements at high altitudes

### Background

Permoda LTDA, headquartered in Bogotá, Colombia, is a multinational retail company with around 40 years in the textile industry. It has more than 8,000 employees over multiple manufacturing plants and more than 400 stores in Colombia, Ecuador and Costa Rica. Although the local grid is considered stable in comparison to the grid north of Colombia, the growing company needed to boost the energy reliability and efficiency at three of its plants in Bogotá (Tequendama, San Pedro, and Calle 19) to reduce energy costs and avoid production losses due to the possibility of blackouts.

### Cost-saving combined heat and power solutions

Since 2017, Permoda has installed three successful combined heat and power (CHP) systems for its Bogotá facilities, delivering a total of 3.5 MW of electrical power with six Jenbacher engines. Two Jenbacher J208 units plus one J312 make up the first installation at a jeans factory and dyeing house; a J312 and a J320 power the second installation at a sewing, washing, and printing plant; and the most recent project relies on a J320 to power a spinning, socks weaving, fabric weaving, pattern making, and cutting plant.

The first CHP project operates in parallel with the local utility to partially cover the electricity demand at two of Permoda's largest production facilities located in the industrial sector of Montevideo in Bogotá.

The project met multiple objectives for Permoda. It takes advantage of the thermal energy used to cool the engine-generator to cover the hot water requirements of the production areas, including boilers. It increased pipeline gas consumption to a minimum average of 74,000 cubic meters per month, allowing the company to access rates that were 30% lower than process gas (used for the boilers) and 50% lower than generation gas (for power generation only). Additionally, it could deliver emergency backup electricity for the plant if the local grid failed to supply power. In 2021, Permoda implemented a photovoltaic energy generation system at its Tequendama production headquarters, allowing for an average consumption reduction from 7,922 kWh/day to 6,517 kWh/day. Detailed engineering analysis helped Permoda overcome complex installation conditions, such as limited space availability and ventilation difficulties. The Jenbacher engines were installed in basement areas with remote radiators on the seventh floor and a 15-meter-long exhaust pipe needed to comply with local emissions requirements.

At Permoda's San Pedro plant, the complete implementation of the energy cogeneration system achieves an energy consumption efficiency of more than 80% for water heating and electricity generation.

**»These cogeneration operations have enabled our textile company to continue to grow internationally with the ability to supply our plants with the stable and efficient power and heat we need. The initial project at our jeans factory was so successful that we added two more CHP projects over the years.«**

William Garzón, Industrial Project Manager, Permoda LTDA

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## Results

Operating all year—24 hours a day, six days per week—on pipeline gas, the plants reliably and efficiently meet the manufacturing facilities' power needs while the waste heat from the engines' operation helps fulfill their heating requirements, including pre-washing of jeans and ironing. This significant boost in efficiency, along with the tax benefits related to the combined heat and power application, has allowed Permoda to save about 25%* compared with buying electricity from the local Codensa grid.

What's more, the projects comply with the stringent local emissions regulation of 300 mg $NO_x$/$Nm^3$ at 15% oxygen—a significant challenge given the 2,600-meter altitude. INNIO's authorized Jenbacher local distributor PEGSA delivers remote monitoring, services, spare parts, and training for the projects as part of a multi-year service agreement signed in 2018.

## Key technical data

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|---|---|
| **Installed engines** | 2 x J208, 2 x J312, 2 x J320 |
| **Electrical output** | 3.5 MW |
| **Thermal output** | 2.1 MW |
| **Total efficiency** | >80% |
| **Energy source** | Pipeline gas |
| **Year of commissioning** | 2017, 2019, 2021 and 2022 |

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## Customer benefits

Permoda is greatly benefiting from its new combined heat and power plants:

- The CHP systems save according to the customer about 25% when compared to grid energy and heat generation from pipeline gas.
- The Jenbacher engines run continuously to meet the facilities' power and heating needs, supplying 7,000 oph/year with availability over 96% since 2017.
- The waste heat created during engine operation supplies all of the thermal energy required by the plants, generating overall CHP efficiencies of more than 80%.
- The equipment used at the CHP plants met the local government's requirements of an energy-efficient site, qualifying them for local government benefits such as fast depreciation schemes, tax deductions, and the elimination of duties.

*according to the customer

INNIO is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With our product brands Jenbacher and Waukesha and our digital platform myPlant, we offer innovative solutions for the power generation and compression segments that help industries and communities generate and manage energy sustainably while navigating the fast-changing landscape of traditional and green energy sources. INNIO is individual in scope, but global in scale. With our flexible, scalable, and resilient energy solutions and services, we enable our customers to manage the energy transition along the energy value chain wherever they are in their transition journey.

INNIO is headquartered in Jenbach (Austria), with other primary operations in Waukesha (Wisconsin, U.S.) and Welland (Ontario, Canada). A team of more than 4,000 experts provides life-cycle support to the more than 55,000 delivered engines globally through a service network in more than 100 countries.

INNIO's improved ESG Risk Rating again secures the number one position across more than 500 companies globally in the machinery industry assessed by Sustainalytics.

For more information, visit INNIO's website at **www.innio.com**

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