

PAMP SA, Castel San Pietro TI

With the replacement of the waste air purification facility in its gold refinery, PAMP SA in Castel San Pietro (TI) has slashed plant electricity consumption by 60% and saved some CHF 26 000 per year.

PAMP is among the world leaders for the processing of gold, silver and other precious metals. At its headquarters in Castel San Pietro (TI), it has been operating a modern refinement and processing facility for precious metals since 1977. Here, precious metal-bearing materials from mining and recycling are separated and cleaned using electrolytic and chemical processes, and the precious metals extracted are turned into bars, coin blanks or semi-finished products for the watch and jewellery industry. The company is a major producer of gold and silver bars and supplies some of the world's largest mints with blanks. As electrochemical processing and melting of metals can generate potentially harmful fumes, proper ventilation of the refinery is essential. Unlike conventional ventilation systems, however, the waste air must first be cleaned before it is emitted into the environment. Accordingly, it is sprayed with water in gas scrubbing towers, where water-soluble substances like acids and bases but also metallic salt particles are washed out.

Such waste air purification systems typically operate continuously. Piping, fans and motors must be able to withstand an aggressive environment. As the air must pass through the towers, comparable flow rates require higher pressure differentials and thus higher performance than conventional ventilation systems, e.g. for an office building.

The PAMP gold refinery previously featured two waste air purification plants. Each had a large fan (37 kW), two gas scrubbing towers and four pumps (ranging from 1.5 to 5 kW). Both plants operated around the clock except

for up to two weeks' maintenance per year. A two-stage control system enabled reduced operation on work-free days, but no further regulation of output was possible during production. Another disadvantage was the lack of redundancy: as production required both plants to be in operation, any maintenance work entailed a stoppage of exploitation.



PAMP SA site. Photo: PAMP



The waste air purification system. Photo: PAMP

During the retrofitting process, the entire waste air purification system was replaced. The two large plants were replaced by four smaller ones, which can now operate independently of each other. Now, with modular deployment, maintenance can be performed on individual plants even while production is running. Each purification plant is equipped with a scrubbing tower, a 15 kW fan and two 4 kW pumps. All motors are compliant with the IE3 standard and feature frequency converters for speed control. The entire system is automatically controlled and requires only as much air as is needed for production. Energy consumption is continuously recorded, allowing further optimisation in continuous operation.

Consumption measurement is clear: the new waste air purification system requires on average some 60% less electricity than the old one. Demand-dependent regulation accounts for the lion's share of this savings effect. The replacement enables PAMP to save around CHF 26 000 per year in electricity costs. However, there is a relatively long amortisation period for the investments, as they cover not only new fans but also complete gas scrubbing towers and new piping. In addition to energy savings, the greater flexibility in operation is a plus: if a plant breaks down or requires maintenance, the other three can take over.

The project was subsidised by the ProKilowatt support programme under the supervision of the Swiss Federal Office of Energy.



«In addition to the safety aspects, the new system enables us to cut electricity consumption and emissions. As a result, it marks a key step towards environmental sustainability.»

Alessandro Ferrario,
Head of Production Services &
Engineering



The fans from the old plants (left) and one of the new fans (right). Photos: PAMP

Topmotors

About one-third of the electricity consumption in Switzerland comes from industry. More than 70% is due to electric motor systems. Topmotors' priority is to give an impulse by encouraging the use of highly efficient motors and intelligent controls. All the Topmotors events, together with practical information, can be found here: www.topmotors.ch

Comparison before / after		
	Before	After
Plant(s)	SB-eco, PRT900	Colasit CMVeco 125-400
Key figures	2x 17 500 m ³ /h 280 mm H ₂ O	4x 13 500 m ³ /h (max.) 300 mm H ₂ O
Motor(s)	2x Felm 3-phase asynchronous motors, 37 kW, IP55, built in 1990	4x Techtop T3CR 160M2-2 15 kW, IP55, IE3
Transmission	Direct	Direct
Operating hours	approx. 8 400 h/a, two-stage operation	approx. 8 400 h/a, flow rate adapted to needs
Energy consumption	287 990 kWh/a	113 055 kWh/a

- Electricity saving per year: 174 935 kWh
- Cost saving per year: CHF 26 240
- Investment costs: CHF 493 255, thereof ca. CHF 75 000 for fans, motors and command
- Subsidies ProKilowatt: CHF 34 440
- Payback: 18.8 years without subsidies, 17.5 years with subsidies