

Micarna SA, Bazenheid SG

With the renewal of the ventilation systems in the cleanroom area, Micarna SA in Bazenheid is saving around CHF 26 000 per year in electricity costs. With the subsidies from ProKilowatt and the lower maintenance costs, the investment will pay for itself in around 3.6 years.

Micarna SA is the leading meat producer in Switzerland. At 25 locations, 3 200 employees process some 200 000 tonnes of meat, poultry and seafood as well as 25 million eggs every year. The Bazenheid site is the second largest production facility after Courtepin FR. Among other things, sausages and deli meat products are produced here, then sliced and packaged in a cleanroom atmosphere at the end of production.

A temperature of 3°C and permanent overpressure are necessary in the cleanroom area. The required air volume, cooling and dehumidification are provided by four large recirculation systems, each with a maximum air flow of 30 000 m³ per hour, which are supplemented by an additional large monoblock for fresh air supply and pressure build-up. Two further ventilation systems with supply and exhaust air supply the changing room area and the access and material locks.

The systems were installed in 2004 and equipped with large radial fans, flat belt drives, IE2 motors and frequency converters according to the state of the art at the time. In the course of an optimisation concept by Lufttechnik AG Wädenswil, the current air volume flow, differential pressure and power consumption at the control cabinet were measured for all fans in 2020. The measurements showed that the systems were operated in a partial load range during normal operation, in which all the components, which are quite efficient in themselves, lose a great deal of efficiency. This resulted in very low system efficiency level and correspondingly high power consumption.

As an optimisation measure, the fans in the existing monoblocks were replaced by modern free-running

fans. Efficient rotor blades designed according to bionic principles, EC motors of efficiency class IE5 and integrated speed control ensure that the overall system can be operated with a high degree of efficiency in a wide load range. With their optimum operating point, the new fans are designed for the volume flows and differential pressures measured in normal operation, but can also supply the maximum air volume if required.

After implementation, the measurement campaign was repeated: in normal operation, some 40% of the electricity demand of the old systems is saved. In addition, the new



Micarna production site in Bazenheid. Photo: Micarna SA.



The cleanroom with the packaging lines. Photo: Micarna SA.

system has a number of other advantages. Without the belt drive, the fans run much more quietly and the «fan walls» consisting of several fans offer very high redundancy. The integrated design with coordinated components also massively reduces the cost of maintenance and servicing: whereas with the old system, approximately CHF 500 to 1 000 per fan and year had to be budgeted for annual inspections, bearing replacements and the occasional replacement of belts, motors or FIs, the new fans are largely maintenance-free and can also be replaced quickly in the event of malfunction.

Installing the new fans in the existing monoblocks made it possible to keep the investment costs low, and the subsidies from the Opti-Food support programme of Energie Zukunft Schweiz reduces them even further. If the cost savings in maintenance and servicing are also taken into account, the remaining investment will pay for itself after only 3.6 years.

The project was implemented by Lufttechnik AG in Wädenswil, and all the key figures forecast in the analysis were also achieved in reality. Implementation was supported by the ProKilowatt funding programme under the guidance of the Swiss Federal Office of Energy.



«The new plant saves not only a lot of electricity, but also a lot of labour time in maintenance.»

Andreas Bürge,
Head of Maintenance
Automation Systems East



One of the large recirculation fans before and after renewal.
Photos: Lufttechnik AG Wädenswil.

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
Key figures for ventilation	Flow rate for each installation between 11 050 and 30 000 m ³ /h, total 186 450 m ³ /h; Differential pressure for each installation between 280 and 1 150 Pa	
Fans	9 radial fans Gebhardt	27 free running fans Ziehl-Abegg
Motors	9 motors EMWB, Eff1, with FC Nominal power 5.5–30 kW, total 167 kW	27 motors ECblue, IE5, with integrated EC-Controller Nominal power 5.5–30 kW, total 167 kW
Transmission	Flat belts	Direct
System efficiency	Between 27 and 50%	Between 61 and 70%
Operating hours	8 112 h/a	8 112 h/a
Energy consumption	548 641 kWh/a	326 537 kWh/a

- Electricity saving per year: 222 104 kWh
- Cost saving per year: CHF 25 960
- Maintenance cost saving over the service life: CHF 52 500
- Investment costs: CHF 220 000 incl. VAT; subsidies ProKilowatt: CHF 73 086
- Payback: 3.6 years incl. subsidies and maintenance costs