

Wastewater treatment

ROBOX energy

ROBOX energy helps a regional wastewater treatment plant to achieve **maximum efficiency** and excellent energy savings.

When Robuschi tested its innovative ROBOX energy WS 65 magnet screw compressor in Dimaro's civil wastewater treatment plant in the Province of Trento, the new technology performed way beyond the client's expectations.

Operational since December 2011, the total oxidation plant for the biological treatment of the public sewerage system serves the municipalities of Dimaro and Commezzadura in the Alta Val di Sole valley. With effluent draining directly into the nearby Noce River, the operator was keen to reduce the environmental impact with the introduction of an additional organic de-nitrification and phosphate removal treatment for the water. The plant's blower units were already equipped with conventional motors and Robuschi technology to ensure the right oxygen levels for the elimination of any organic matter in the

waters. A sludge sedimentation system treats the sludges and sends them to landfill.

A UNIQUE CHALLENGE

The Dimaro plant presents an unusual challenge. While all other treatment plants in the area feature canonical 4.5m-deep oxidation tanks, the Dimaro tanks are 7m deep. In addition, the plant is located about 800m above sea level, resulting in a significantly lower atmospheric pressure compared to other sites. As **Giovanni Stancher, Production Warehouse Manager of Provincia Autonoma di Trento** wastewater treatment plants explains, "These unfavourable pressure conditions placed heavy demands on the existing machinery, but the new Robuschi ROBOX energy compressor offered a very attractive solution."

OPTIMAL CONFIGURATION

The Dimaro plant's first turning point happened when Robuschi introduced a low pressure ROBOX screw compressor with a conventional motor. Stancher recalls, "After trying it in our other

plants we installed it in Dimaro in 2012, confident that the technology would be ideal to meet the tough challenges of this particular site." In fact, the new compressor was able not only to replace one of the existing ROBOX lobe evolutions, but actually met the entire plant's requirements on its own. Then in late 2015, another challenge arose: Robuschi asked the Province of Trento to test its innovative new compressor model, the new ROBOX energy WS 65 compressor. Stancher reflects, "We're always happy to test good new technologies and with our previous experience of ROBOX products, this was an attractive opportunity that we willingly accepted. What's more, it gave us the opportunity to compare two models of the same machine equipped with two different motors. At this point we had the ROBOX evolution three-lobe blower with a conventional motor, a low pressure ROBOX screw compressor with a standard motor and belt drive, and finally, the new ROBOX energy screw compressor with a permanent magnet motor."

Once again, the Dimaro owners and managers were delighted with the results and purchased the new WS 65 screw compressor in July 2016

COMPACT, EASY AND EFFORTLESS

The configuration of ROBOX energy (which integrates both the inverter and the electric dashboard internally) also allows for an easy and effortless installation process. Stancher comments, "The machine's very compact design has meant that it has integrated perfectly into the pre-existing com-



pressor room and takes up much less space than any of the alternatives. We simply had to feed the power supply and oxygen gauge signal to the machine in order to calibrate it according to the dissolved oxygen levels. It was extremely easy: ROBOX energy is truly a 'plug and play' solution. Robuschi's technicians oversaw the whole process and ensured that the unit's many

advantages are perfectly optimised to suit our plant's processes."

PERFECTLY BALANCED

Along with continuous, faultless operation since December 2015, the Dimaro wastewater treatment's ROBOX technologies also allow it great flexibility. ROBOX energy has become the plant's main machine. It runs alongside the traditional ROBOX screw compressor unit, which acts to compensate for any marked load increases during the summer tourist season or at other times

of high demand. It also operates as a spare machine if the main compressor needs inspections, maintenance, or repairs. Stancher, comments, "This way we have a complete system comprising just two units that can work either together or in rotation while also giving us maximum flexibility."

Indeed, one of ROBOX energy's most interesting features is its versatility. Its

Smart Process Control analyses process data and modifies the machine's operation to match the varying oxygen supply required throughout the day. Stancher explains, "Water requirements are not constant: there are peak periods followed by various falls and rises. It's the machine's job to maintain a constant oxygen level according to the value set. This feature, made possible by the integrated inverter, prevents the on-off alternation that would decrease plant efficiency. In addition, it prevents peaks in oxygen flow, thus improving the quality of the wastewater treatment. The advanced ROBOX technology therefore simultaneously saves energy and optimises the quantity of oxygen, with zero waste." For the plant owners and managers, the new compressor delivers lower running costs, fewer problems and therefore, greater savings.

A LONGSTANDING PARTNERSHIP

The plant has now been working at its new, higher capacity for several months and the five conventional model blowers no longer used will either be moved elsewhere or kept as spares in case of need at other sites.

Meanwhile, the data recorded to date from the Dimaro plant demonstrates the new technology's impressive benefits. "We've recorded an efficiency yield variance of up to 25% between the new ROBOX energy and the lobe blower ROBOX evolution. However, when compared to the ROBOX screw compressor, the difference in efficiency reaches 9%." Stancher explains that these remarkable results are due to the increased efficiency of the new

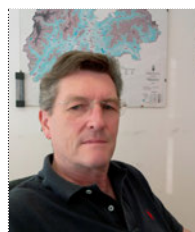
machine's motor, and to its drive- and belt-free configuration which reduces mechanical loss by comparison with other models. Indeed, the absence of mechanical components in this technologically advanced model make it easier to install, more robust, far less susceptible to breakdowns – and therefore simpler and cheaper to manage and maintain. He adds, "The entire plant is controlled remotely via our proprietary system, and the ROBOX energy's Smart Process Control technology communicates directly between our system and the machine's control unit. Direct intervention and maintenance, however are handled on-site. We have established an enduring relationship with Robuschi and should any issue arise we know we can always rely on their technicians to give us any support we need." He adds, "Both the quality of the technology and the savings it delivers are important, but the excellent after-sales support and collaboration are fundamentally important to our success."



ENERGY SAVINGS: THE PRIMARY OBJECTIVE

The excellent Dimaro experience and results certainly establish a model for other plants in the Trentino area, especially where deeper tanks – and therefore higher pressure compressors such as the new ROBOX energy WS65 – may be necessary. The greatest costs in such plants arise from sludge disposal and energy, so

making significant energy savings is a very important achievement, particularly given that saving energy is a key strand of the Autonomous Province of Trento's philosophy. Stancher explains, "We aim for energy self-sufficiency in all our plants. For example, we've built a 100% 'energy self-sufficient' wastewater treatment plant in the Folgaria district, powered by photovoltaic panels and a turbine that produces electric power from wastewater. These developments are driven not only by our ethical standpoint but also by tangible economic advantages." Saving on energy costs releases more money to spend on other aspects of plant management, and as such, the advances at the Dimaro plant demonstrate how technology such as Robuschi's can play a leading role.



"The new ROBOX energy WS 65 allows our plant to save energy, reduce costs and optimise the quantity of oxygen in the wastewater treatment tanks."

Giovanni Stancher, Production Warehouse Manager, Wastewater Treatment Management Service, Provincia Autonoma di Trento's.



Pic. 1 - Compressor Room with ROBOX energy

Pic. 2 - Dimaro's Wastewater Treatment Plant

Pic. 3 - Dimaro's Oxidation Tanks