WWTP Adelsdorf, Germany

Direct order, smooth project execution, guaranteed energy savings!

"I thank you most warmly for quick, uncomplicated and very competent processing (…) and for the very pleasant and frank atmosphere (…)."
Letter from Mr. Karsten Fischkal, first Mayor of the municipality of Adelsdorf in August 2012.

The Adelsdorf wastewater treatment plant, which is in operation since 1977, has a design capacity of 25,000 PE with an industrial wastewater share of approx. 40%. The industrial companies connected to the plant include a sweets factory, a canning factory and smaller breweries. The industrial wastewater is not pre-treated, but is buffered in a buffer tank and regularly added to the inlet water. The wastewater treatment plant handles an average load of 17,500 PE with carbon load of up to 25,000 PE.

The biological wastewater treatment is performed in a circular ring tank with a volume of 2,880 m³, intermittent denitrification and simultaneous aerobic activated sludge stabilisation. The secondary clarification is performed in the inner zone of the tank.

Initial situation:

The energy efficiency optimisation of the wastewater treatment plant occasioned an upgrade of the aeration system. During selection, special emphasis was placed on long service life of the aeration system, besides efficiency, bearing in mind that the Adelsdorf wastewater treatment plant has only one activated sludge tank. Three mixers were available for mixing. Two blowers (motor power 65 kW and 37 kW) as well as a spare machine (motor power 65 kW) were available for air supply.

Implementation:

Following comprehensive preliminary planning and load calculation by RUDOLF MESSNER UMWELTTECHNIK AG, a proposal was submitted to the Adelsdorf municipal government in January 2012 for upgrading the biological stage using the RMU Plug Flow Technology. In this method, the activated sludge mixing is taken care of by the aeration system itself. In the denitrification phase, the activated sludge is homogeneously mixed by RMU Air Pulsing, which is integrated in the process control and automation system. An important advantage hereby is that mixers can be dispensed with completely. The preconditions for application of this technology are a full floor coverage of approx. 20% and a partition wall between inflow and outflow to avoid short-circuits.

Figure 1: Activated sludge tank of WWTP Adelsdorf during and after installation of the MESSNER Aeration Panels.

(please turn over)

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In April 2012, the contract was awarded directly to RUDOLF MESSNER UMWELTTECHNIK AG in a single-tender action and the project was already executed in July. Within 4 days, the old aeration system and the mixers were dismantled and 72 MESSNER Aeration Panels as well as a partition wall were installed. Since then, the biological stage of the wastewater treatment plant Adelsdorf has been running uninterruptedly with stable discharge values that are well below the limit values. Moreover, as a result of the energy efficiency optimisation action the blower capacity could be reduced considerably. One 65 kW machine was replaced by a smaller one with merely 37 kW motor power. During normal day-time operation, this capacity now suffices completely for covering the oxygen requirement.

Result / Benefit:

At the time of procurement, RUDOLF MESSNER UMWELTTECHNIK AG had guaranteed an achievement of minimum 20% energy savings. Following the upgrade of the aeration system using RMU Plug Flow Technology, energy consumption could in fact be reduced by 47%. The savings can be attributed to the high-efficient aeration and mixing technology as well as to the implementation of the dynamic RMU control and automation concept.

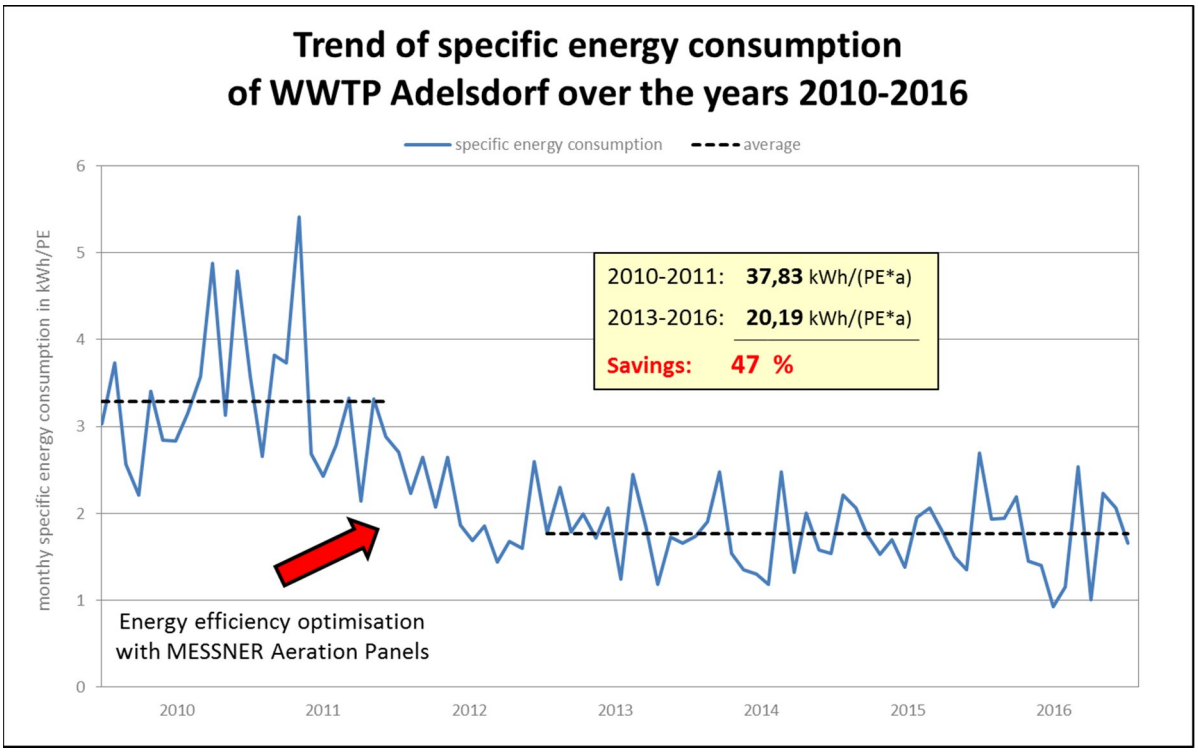

Figure 2: Influence of aeration system upgrade using MESSNER Aeration Panels on per-head energy consumption of the Adelsdorf wastewater treatment plant.

The process control system is based on a floating O_2 setpoint shift which enables demand-responsive oxygen supply. The inflow load trend is monitored via ammonium measurement at the inlet. Thus, if the trend is towards increasing inflow load, the biological activity can be increased in anticipation by adjusting the oxygen setpoint and vice versa. At the same time, the ammonium and nitrate measurements at the outlet of the activated sludge tank regulate the aeration times for optimisation of denitrification.