

Off-gas-based aeration control identifies **blower-energy saving potential** without compromising treatment

Off-gas aeration control

Schwäbisch Hall • Baden-Württemberg • Germany



EmiCo lite at the aeration tank

KEY FACTS

- Continuous off-gas monitoring **identifies aeration surpluses** and shows when aeration can be safely reduced.
- The **Carbon Factor** uses CO₂ and O₂ in the off-gas to distinguish the oxygen demand for carbon removal from that for nitrification – something DO sensors alone cannot do.
- On this plant, the analysis identified a blower-energy saving potential of **up to 7%**, without compromising treatment performance.

PROJECT AT A GLANCE

up to 7%
BLOWER-ENERGY SAVING

288 days
CONTINUOUS OFF-GAS
MONITORING

0
NEW SENSORS REQUIRED

Add-on
SUPERVISOR CONTROL LOGIC

≈85,000 PE • activated sludge, 4th stage added

1 The starting point

Continuous off-gas monitoring does not only capture greenhouse-gas emissions; it also provides the basis for data-driven aeration optimisation. For this, an EmiCo lite was deployed for 288 days on a continuously aerated activated-sludge tank at the Schwäbisch Hall wastewater treatment plant, continuously measuring N₂O, CH₄, CO₂ and O₂ in the off-gas.

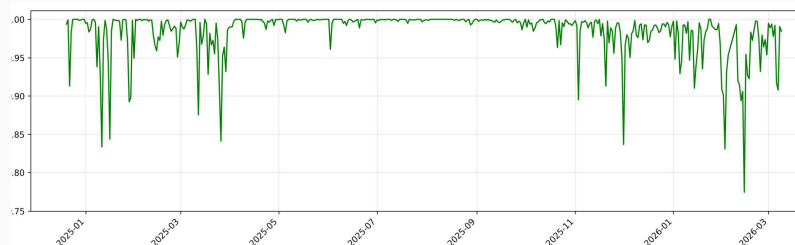
2 What continuous monitoring revealed

Beyond the greenhouse-gas emissions, continuous off-gas monitoring delivered a further important insight. Jointly evaluating CO₂ and O₂ concentrations revealed when more air was being supplied than a stable treatment process required. This made it possible to identify **aeration surpluses** that conventional DO sensors alone cannot detect.

3 From signal to blower savings

Continuous off-gas monitoring forms the basis of a conservative **supervisor logic**. It identifies periods when spare nitrification capacity is available and aeration can be reduced. Whenever the additional oxygen reserves are required again, aeration is automatically increased. On this plant, the analysis identified a blower-energy saving potential of **up to 7%**.

Simulated blower setting based on off-gas analysis (1.00 = baseline)



The proposed supervisor logic identifies periods where the current airflow could potentially be reduced while maintaining stable process operation. On this plant, the analysis identified a blower-energy saving potential of up to 7%.

THE TAKEAWAY

One measurement, two benefits: continuous off-gas monitoring quantifies greenhouse-gas emissions while simultaneously identifying potential for aeration optimisation. On this plant, the analysis identified a blower-energy saving potential of **up to 7%** without compromising treatment performance.