

Wastewater Process N₂O Sensor for Greenhouse Gas Emission Control

Large impact on carbon footprint

N₂O is a highly neglected greenhouse gas which has a global warming potential 300 times higher than CO₂. Recent research has concluded that Wastewater Treatment Plants (WWTP) can emit extensive amounts of N₂O under certain process parameters and conditions, and studies in Netherlands, France, USA and Australia have shown that for some WWTP's, N₂O emission can account for up to 90% of their total carbon footprint.

Measuring N₂O is crucial

Traditionally N₂O emission from WWTP's was only estimated by use of the IPCC emission factor at 3.2 g N₂O/PE/year, because direct emission monitoring was highly complicated and costly. Studies suggest that on average terms, this emission factor is most likely underestimated by up to ten times and leading scientists suggest that the employment of such emission factor is inadequate also given the large variation of emission among different WWTP's. They therefore recommend implementation of online measurements.

Costly and vulnerable off-gas measurement

Until recently off-gas measurements were the only technology available but this method is expensive, highly complicated and vulnerable, so therefore its use has been very limited.

Unique N₂O industry standard sensor

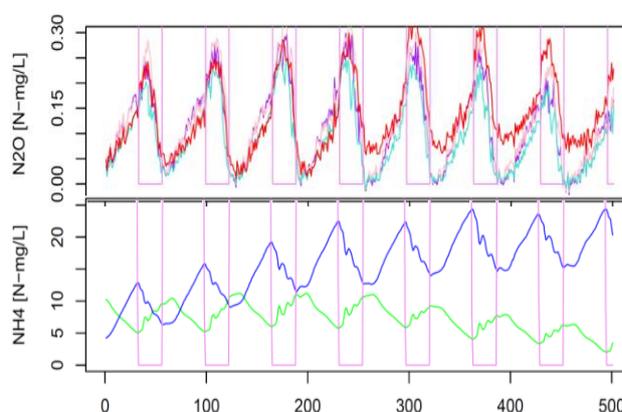
Unisense recently launched our online sensor which measures dissolved N₂O continuously:

- **Cost effective** - with up to 80% savings compared with off-gas equipment
- **Fortified** - with more than 4 months sensor lifetime in 24/7 conditions
- **Fast** - responding in less than one minute
- **Integrated** - into the SCADA system for continuous measurements
- **Independent** - works during denitrification without air flow



Real-Time CO₂ Equivalent Emission Estimation

Long term studies have documented high levels of performance, sensitivity and durability of the sensor which qualifies the sensor as a perfect and reliable tool for continuous online measurements of dissolved N₂O.



Moreover, direct comparison with well-controlled off-gas data has proven and validated the real-time emission calculations based on our N₂O sensor process values.



Breakthrough bioprocess control with the N₂O Sensor

Unisense believes that there is a large potential in combining today's wastewater bioprocess control know-how with the new industrial sensor for N₂O, to reduce the environmental impact of this potent GHG. New state-of-the-art bioprocess controls can be developed using input from the novel N₂O sensor yielding a clear environmental advantage over standard control regimes.