

Greenhouse gas emission quantification from wastewater treatment plants, using a tracer gas dispersion method - DTU Orbit (09/11/2017)

Greenhouse gas emission quantification from wastewater treatment plants, using a tracer gas dispersion method

Plant-integrated methane (CH₄) and nitrous oxide (N₂O) emission quantifications were performed at five Scandinavian wastewater treatment plants, using a ground-based remote sensing approach that combines a controlled release of tracer gas from the plant with downwind concentration measurements. CH₄ emission factors were between 1 and 21% of CH₄ production, and between 0.2 and 3.2% of COD influent. The main CH₄ emitting sources at the five plants were sludge treatment and energy production units. The lowest CH₄ emission factors were obtained at plants with enclosed sludge treatment and storage units. N₂O emission factors ranged from < 0.1 to 5.2% of TN influent, and from < 0.1 to 5.9% of TN removed. In general, measurement-based, site-specific CH₄ and N₂O emission factors for the five studied plants were in the upper range of the literature values and default emission factors applied in international guidelines. This study showed that measured CH₄ and N₂O emission rates from wastewater treatment plants were plant-specific and that emission rates estimated using models in current guidelines, mainly meant for reporting emissions on the country scale, were unsuitable for Scandinavian plant-specific emission reporting.

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