23 June 2021 (Wednesday)

4.00pm-5.30pm (SGT) (GMT +8)
Session 3.3 – Intensification of Anaerobic Digestion

Session Chair(s): Peter Nicol (Canada)

Biological Hydrolysis Pretreatment For Enhanced Sludge Anaerobic Digestion And 'Class A' Biosolids

M. Theodoulou, Y. Hong, A. Bentham, Z. Xu, T. Robertson, J. Lim, H. Ding, H. Chen, S. Chang. SUEZ Water Technologies & Solutions (Canada)

This paper will outline the SUEZ Water technologies & Solutions' biological hydrolysis (BH) pretreatment technology, and the performance of its demonstration pilot on the aspects of volatile solid reduction (VSR), biogas production and pathogen inactivation/regrowth after anaerobic digestion with municipal sludge. The performance of this demonstration pilot is compared directly to a nearby wastewater treatment plant's full-scale conventional anaerobic digestor with same feeding sludge. The results show that the BH pretreatment technology is able to increase the digestor efficiency, enhance biogas production and produce Class A biosolids. Metagenomic sequencing and microbial community analysis are performed to understand BH pretreatment impacts on anaerobic digestion.

Achieving Energy Positive Wastewater Treatment, Enabled By Biological Hydrolysis -- A Demonstration Of Sustainable Performance At The Bristol WwTW At Avonmouth, UK

M. Theodoulou, G. Stock, Y. Hong, W. Wong. SUEZ Water Technologies & Solutions (Canada)

Domestic wastewater treatment methods are energy intensive. To offset the energy used, Anaerobic Digestion (AD) is regularly implemented to capture renewable energy from the wastewater sludge. In conventional practice, energy captured from wastewater sludge, if converted into renewable electricity, could amount to 50% of the wastewater treatment plants' (WWTP) parasitic electrical load. AD infrastructure built at WWTPs are designed to process sludge inventories from that respective plant. Due to the dilute nature of the sludge, the digestion infrastructure can be underutilized. Progressive plant owners and communities are viewing these underutilized assets as an opportunity to recover valuable resources from not only wastewater sludge, but other organic materials. This paper outlines the transformation of one of the Bristol Wastewater Treatment Works (WwTW) at Avonmouth in the UK, serving a population equivalent of over 800,000 people, into an advanced anaerobic digestion energy centre treating both Biosolids and Biowaste.

Assessing Resilience Of A Regional Sludge Strategy Incorporating Advanced Anaerobic Digestion (AAD)

D. Buxton. Mott MacDonald Ltd (United Kingdom)

Sustainable management and disposal of wastewater sludge is a key issue facing all water utilities. Tightening nutrient and heavy metal limits on agricultural use are adding to the increasing pressure placed on companies to be more self-sufficient with their energy use. Many are turning to advanced solutions, leading to more centralisation of sludge treatment at facilities designed to use the latest technology to maximise resource recovery, thus supporting principles of a circular economy. However, one factor that must be considered when centralising treatment is resilience to ongoing operations. As part of the North Wales Sludge Strategy, a detailed resilience study of both the catchment and the Advanced Anaerobic Digestion facility were undertaken to define key failure scenarios, test arrangements and develop engineering solutions. The outcome was the identification of key areas that require an alternative approach, enabling the team to generate a template for other sludge strategies to follow.

Integration Of Sludge Ultra-dewatering Into The Energy Positive WWTP Of Tomorrow

M. Choo-Kun, M. Chevrel, P. Camacho, JL. Bourdais, A. Poignant, A. Fournot-McGill. SUEZ (France)

The Dehydris Ultra technology was recently developed to achieve ultra-dewatering of wastewater sludge, moving towards maximum biosolid reduction. Concept, process and technology were proved on a 24 000 PE demonstration unit. The technology is based on the thermo-chemical reaction of HydroThermal Carbonization (HTC) coupled with post-dewatering by piston press. High drynesses can be reached with such a process: up to 70% Dry Solids (DS) with three to four times less energy demand than thermal drying. While increasing the hydrophobicity of the dewatered sludge's organic matter, this reaction concentrates carbon and thus the inherent calorific value of sludge final cake (He, 2013). Integrating ultra-dewatering into tomorrow's WWTP reduces up to four times biosolid disposal compared to conventional dewatering, without external thermal energy supply if filtrates from post-dewatering are anaerobically digested. Among thirteen typical sludge treatment lines, it is positioned among the first for overall energy balance and biosolid disposal.