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CASE HISTORY

ANAEROBIC DIGESTATE TREATMENT – A REVOLUTIONARY ALTERNATIVE TO TRUCKING & SPREADING

The problem

Traditionally AD digestate is disposed of by trucking away and spreading the digestate on agricultural land. This is a costly process which quickly becomes prohibitive the further the land bank is away from the AD site. Trucking away and spreading of whole digestate represents a significant cost (and head ache) to the AD operation.

Disposal of digestate in this manner is also costly to the producer in terms of lost resources (process water make-up & chemical fertiliser displacement opportunity cost and administrative costs), and is being constrained further by ammoniacal emissions levies (incurred either in transportation or spreading activities) and the expansion of Nitrate Vulnerable Zones which preclude spreading on or near these ecologically sensitive areas.

From a regulatory perspective, various government incentives and levies are in the pipe-line as a Net Zero Strategy is implemented to ensure compliance with the 2030 decarbonisation objectives. A new revenue stream is projected for AD operators, whereby Greenhouse Gases (GHG's) removal is incentivised through the Emissions Trading Scheme (ETS). Operators would be able to sell green carbon ("bio – CO2 "), or earn carbon credits by storing carbon through recognised circular economy activities.

Esmil Process Systems have developed a complete systems solution to AD digestate treatment which eliminates the need for digestate truck-and-spread. Using proprietary technologies, Esmil can now convert digestate into 3 cost neutral or revenue generating streams.

The ESMIL process

Firstly, the digestate is pre-treated chemically and physically to allow for efficient treatment at the subsequent membrane blocks. A filtrate is recovered from pre-treatment which is fed to the core of the process, centred on reverse osmosis membrane technologies. Recovered fibre from the pre-treatment process is recovered as a phosphate rich compostable material which is stackable, easily stored and has significant soil conditioning potential.

Secondly, the recovered filtrate is fed to a proprietary VSEP RO (Vibratory Shear Enhanced Process Reverse Osmosis) membrane system. Unlike standard membrane systems, the VSEP process can easily handle high solids streams without irreversible fouling and still yield high clean water recoveries.

The VSEP process produces a permeate which is treated further using standard RO membrane systems to recover water which meets process recycle requirements, or discharge to watercourse specifications as per local EA standards. The VSEP also produces a concentrate which is rich in recovered nitrogen, potassium and phosphate salts. This product is eminently marketable as a high-performance fertiliser in the agricultural/horticultural sectors.

In summary, digestate is converted into 3 product streams which are either cost neutral or revenues to the AD operation.

ESMIL
WASTE WATER TREATMENT SYSTEMS

CUTTING EDGE SOLUTIONS
FOR CHALLENGING INDUSTRIAL EFFLUENTS

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The ESMIL benefits

- Small footprint system easily bolted on to existing plant.
- Low opex impact – typically < £ 2 per m3 digestate treated.
- Positive change in digestate economics compared to truck-and-spread operations.
- Valorisation of GHG removal.
- Potential income through ETS in carbon trading markets.
- Ammoniacal emissions largely eliminated.
- Positive contribution to Net Zero strategy initiatives.
- Potential for a Zero Liquid Discharge digestate system if waste heat is available.

The ESMIL advantage

Esmil Process Systems seek to deliver cost efficient, bespoke system solutions for industrial waste water treatment in the anaerobic digestate sector. For further information please access the ESMIL website.