Sewage Sludge

Sustainable Dealing with What is Left Over

Sludge is left upon completion of cleaning in sewage treatment plants. Such sludge must be treated or else disposed of – but it is wet and heavy, transport is expensive and has a detrimental impact on the environment. Yet, there is a more sustainable way: Sabrina Immler explains a procedure using sludge drying.

Photo: Harter

Sludge drying in a mobile heat pump dryer: Small communities may associate to finance it and use it in turn.

The treatment and disposal of sewage sludge poses engineering, ecological and economic challenges to plant operators. There is still a lot of water left in mechanically pre-dewatered sludge, water that raises the volume and weight to be transported considerably. This results in higher cost of operation and environmental impact through transport related emission.

An energetically efficient and exhaust air free sludge drying system may significantly reduce such effects and, thus, the ecological footprint of sewage treatment. This may be done, for example, using a heat pump assisted condensation drying system featuring a closed air circuit with no exhaust air. In this case, the power required to extract water at temperatures between 30 °C and 60 °C is 0.5 kW/litre – as opposed to 1.5 kW for hot air drying.

Uniform sludge drying is obtained by the use of extremely dry air and precise air routeing – which ensures constant product quality. The closed air circuit prevents exhaust air emission and makes the drying process independent of climatic influences and the seasons.

An environmental benefit is obtained by the reduction of the sludge material: weight and volume may be reduced by as much as 70 percent which results in commensurate reduction of the transport movements required. The resulting reduction of fuel consumption and transport related carbon emission is an essential contribution to minimising communal wastewater treatment emission.

INTEGRATION IN THE CIRCULAR ECONOMY

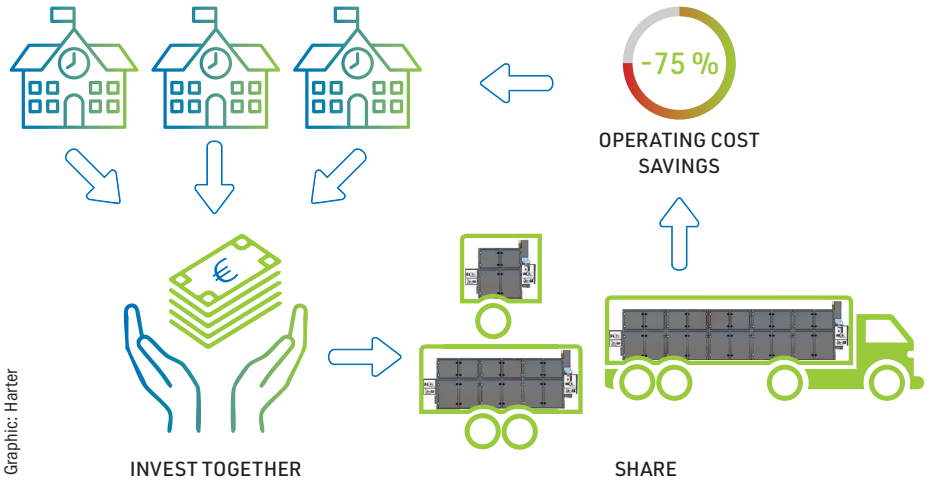
Moreover, drying makes sludge available for continued use – by adding it to the material burned in industrial incineration plants or be recovering phosphorus and other nutrients. This does not only contribute to resource conservation but also supports a future-oriented circular economy in terms of sustainability.

The modularity of the drying system enables scaling as required. Individual modules – designed for about one ton, or else two, three or four tons per day – may be arranged in a row as needed. The capacity of the system may thus be readily adapted.

LESS COST, BETTER UTILISATION

These modules are also suitable for mobile use and may be installed on vehicles or trailers. This allows for economic use by smaller communities which may form an association and use the drying system in turn. Such scheme will optimise system utilisation,

INTER-MUNICIPAL CO-OPERATION



Graphic: Harter

Cost savings by joint use of mobile heat pump dryers.

minimise investment cost and promote efficient resource usage.

Government subsidy for heat pump assisted condensation drying has been available in Germany, Austria and Switzerland since 2017. The technology meets current climate protection and sustainable circular economy requirements. It provides a future fit solution for communal and industrial operators offering low cost of operation combined with reduced emission and recycling or thermal utilisation of sludge.

Heat pump assisted condensation drying is a well-engineered, exhaust air free and sustainable approach towards coping with of sludge disposal challenges. The integration of modular, mobile systems opens up new possibilities for flexible and cost-effective usage schemes. The technology thus makes a major contribution to the conservation of resources, the reduction of greenhouse gas emission and the compliance with sewage treatment regulations.

Sabrina Immler

THE AUTHOR

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