OUTOTEC MODULAR ENERGY AND PHOSPHORUS RECOVERY PROCESSES

LUDWIG HERMANN
SENIOR CONSULTANT ENERGY, OUTOTEC, ludwig.hermann@outotec.com, www.outotec.com

INCINERATION OR GASIFICATION OF PHOSPHORUS RICH WASTE FLOWS

Incorporation or gasification is the key to phosphorus recovery with high efficacy = effectiveness + efficiency. Outotec’s fluidized bed incineration or gasification techniques generate energy and produce a renewable phosphate concentrate from all phosphorus rich feedstocks.

Feedstock:
Municipal sewage sludge, farmyard manure solids, animal by-products

Products:
- Ash borne phosphate concentrate, containing 20-35% P2O5, similar to phosphate concentrates from rock
- Heat and energy carriers (steam, electricity or syngas)

Downstream processing to high value, pollutant free fertilizers depends on the type of original feedstock.

- Low impurity ash borne concentrates - for instance animal by-products or chicken litter ashes - are recommended for wet chemical processing by the ASH DEC process
- High impurity, ash borne concentrates - for instance sewage sludge or pig manure ashes - are recommended for thermo-chemical processing by the ASH DEC process

ASH DEC

Feedstock:
Ash, gasification residues, biochar

Product:
Phosphate fertilizer with Mg, S and trace nutrients and high bio-availability

Outotec ASH DEC technology is a thermo-chemical process which eliminates heavy metals from ash while making nutrients plant available.

How it works:
Ash and alkaline additives are mixed and heated to 800-1000°C in a reactor, where phosphate and additive compounds are cracked to form bio-available phosphate compounds. Pollutants (heavy metals = HM) are forced to the gaseous state to be removed by the air pollution control system.

Best economic results and lowest environmental footprint are achieved by vertically integrating the fertilizer manufacturing plant to the sludge or manure incinerator. Integrated plants may share a number of compounds saving CAPEX and may save repeated heating cycles saving energy and OPEX.

POTENTIAL TECHNICAL RENEWABLE ENERGY YIELD OF EU27 MANURE:
183 TWh (7180 x 10^13 J) = 2% of TOTAL ENERGY CONSUMPTION

Sustainable use of Earth’s natural resources