



SEPARATION

EXTRACTING VALUABLE ENERGY FROM SEWAGE SLUDGE

PADDLE DRYERS FOR WASTE-TO-ENERGY PLANTS

The ANDRITZ logo is displayed in a bold, blue, sans-serif font. It is centered at the bottom of the page, above the tagline. The background of the entire page is a photograph of a wastewater treatment plant at night, with a large white cylindrical tower and various industrial buildings illuminated by streetlights, with their reflections visible in a body of water in the foreground.

ENGINEERED SUCCESS

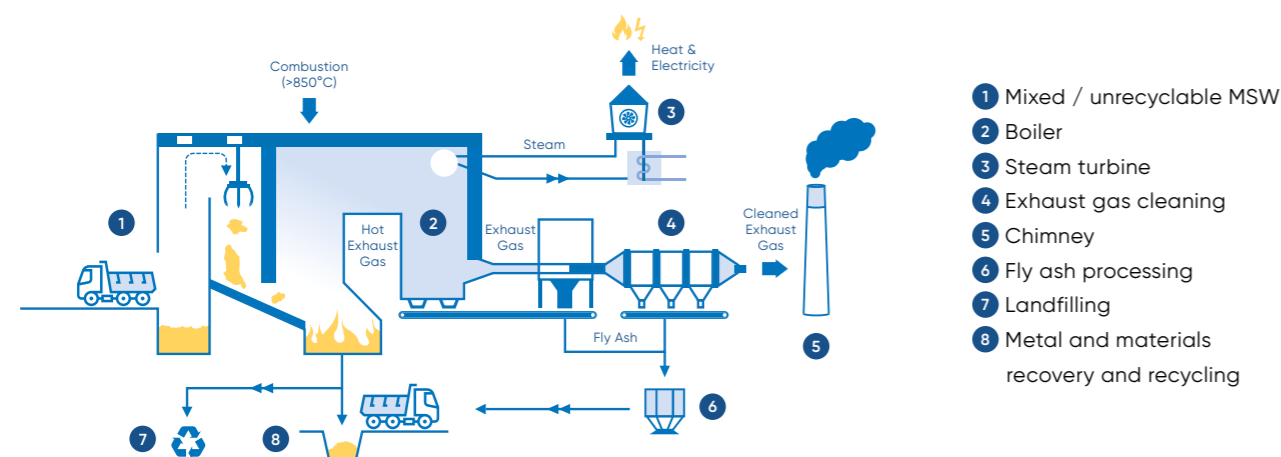
Using sludge in a waste-to-energy plant

Co-combustion of sewage sludge in municipal solid waste plants is gaining interest worldwide. In addition to the fact that it helps solve the sewage sludge disposal problem for local municipalities, waste-to-energy plants are the perfect location for extracting the valuable energy content that exists in sewage sludge.

After being dried to approx. 90% dry solids, sewage sludge shows calorific values from 8 to 17 MJ / kg depending on its organic content. This dried sludge can be used as fuel inside the waste-to-energy plant, and is normally mixed with the municipal solid waste before combustion. The benefit of combining a sewage sludge drying installation and a municipal solid waste plant is the perfect environment that a waste-to-energy process offers for the sewage sludge drying line. The municipal solid waste combustion process normally generates a lot of steam and waste heat that can be used to operate the sewage sludge drying line. Hence, the sewage sludge drying installation does not require external heating sources, thus minimizing the thermal energy costs, which form the largest share of the operating costs for the drying lines installed in municipal WWTP's for example. By using an ANDRITZ Gouda paddle dryer for the sludge drying line, the off-gas volumes are so small that they can easily be treated thermally in the combustion process itself, eliminating any biological or other multi-stage filter for treating the off-gas. The condensate produced should either be discharged into the sewage system or it can be treated locally.

INSTALLATION FEATURES

One essential requirement for treating sewage sludge in a municipal solid waste plant is the flexibility of the sewage sludge drying system to cope with many different kinds of sewage sludge that are imported into the facility. Typically, municipal solid waste plants can take sludge from various local facilities, where the sludges may also have undergone different forms of pre-treatment. In other words, the sludge consistency at the intake of a municipal solid waste plant varies much more than the sludge at only one wastewater treatment plant. Nevertheless, the sludge received is normally dewatered by means of a decanter centrifuge or belt filter press. After dewatering, the sludge typically has a dry solids content of approximately 18 to 25%, and sometimes up to 35% if lime stabilization has been applied, which is all very suitable for thermal treatment in an ANDRITZ Gouda paddle dryer. More and more sludge is digested before dewatering to generate biogas as a renewable energy. Even though the behaviour of digested and undigested sludge can vary a lot, a sludge drying installation at a municipal solid waste plant must be able to handle all types and mixes.



ANDRITZ Gouda paddle dryer, Schwenk Zement, Germany

NATURAL COMBINATION

By using heat exchangers, the hot exhaust gas from the municipal solid waste combustion process is used to provide either steam or thermal oil with a temperature of 190 to 230°C, which flows continuously through the jacket, the hollow shafts, and the paddles of the dryer. Due to the indirect ("contact") concept of drying the sludge, the exhaust from the drying installation mainly consists of vapour and a very small amount of non-condensable gases. The vapour is normally condensed in a direct (spray-type) or indirect condenser (heat exchanger) and the condensate must be discharged or treated if necessary. The remaining non-condensables leave the condenser at the top and must be treated to prevent unpleasant odours. Due to the very small amount involved, they can easily be treated thermally in the municipal waste combustion unit.

The ANDRITZ Gouda paddle dryer does not require back-mixing to overcome the possible plastic phase of the sludge, occurring typically between 45 and 55% dry solids. Hence, the equipment needed to dry the sludge from 18 to 90% solids remains simple and is reduced to a minimum.

KEY FEATURES

- Compact, safe, and simple
- Closed loop implementation
- Most flexible for all different sewage sludges
- Cost-efficient

THE HEART OF THE PROCESS

The heart of the installation is the ANDRITZ Gouda paddle dryer. It consists of a trough containing two counter-rotating shafts, equipped with paddles. The sludge is fed in at one side and flows through the dryer while being agitated / mixed by the paddles on the shafts. The heat is transferred from the thermal oil / steam inside the trough jacket, the shafts, and the paddles through the metal wall into the sludge. This indirect heat transfer avoids air flows, while the fully enclosed operation enables safe treatment of the sludge due to the absence of oxygen.



WHAT'S YOUR SEPARATION CHALLENGE?

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