



Energy from tannery solid waste

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Südleder manufactures both chrome tanned and wet white tanned leathers from bovine hides for the automotive sector on a contract tanning basis. The capacity of the plant is up to 3,500 hides per day, and in recent years the company's objective has been to retain this flexibility, but also to develop the use of a bioenergy plant to:

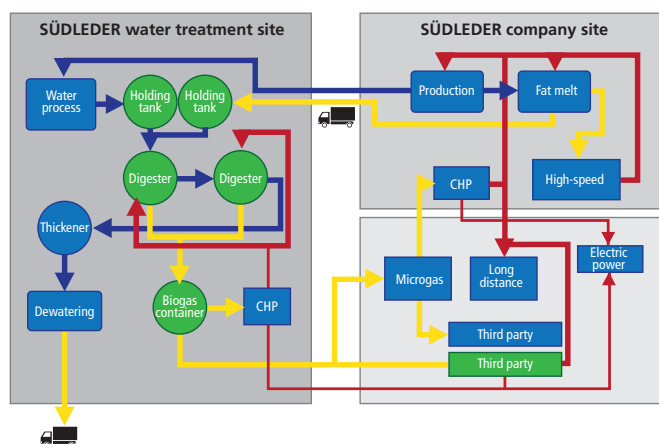
- Produce heat and power from tannery waste
- Be independent of external power providers
- Have predictable energy costs
- Reduce emissions of carbon dioxide
- Optimise energy recovery
- Reduce the quantity of waste for ultimate solids disposal
- To address matters of sustainability

This project started some 20 years ago at laboratory scale, and then moved to pilot scale to assess the effects of variations and changes in leather making over a long period of time. On the basis of these findings, a bioenergy plant has been installed, and has been in operation for more than two years; a diagram showing the design and function of the plant is shown in *Panel 1*.

The plant operates as follows:

- A fat recovery process is used where lime fleshings are first maserated then heated using a heat exchanger to release the fat and grease. This mix is then centrifuged to separate water and proteins from the recovered fats and grease, which are then stored in a dedicated holding tank.

Panel 1: Bioenergy plant: Design and function



- Within the main effluent treatment plant, the wastewaters are first mixed to balance and homogenise, then chemically dosed with ferrous salts to precipitate soluble components from the wastewater and lower the COD/BOD of the effluent. The supernatant is then treated biologically using the conventional activated sludge treatment process of the municipal treatment plant to further lower the oxygen demand to required limits, and discharged from site.
- The sludge formed by the settling of solids following chemical dosing of the effluent and sludges from the activated sludge



treatment process are pumped from these operations into a holding tank.

- These sludges together with the protein remainders of the fat recovery are then digested anaerobically in two 4,000m³ fermenters.
- In this stage the organic content of the sludge is reduced by anaerobic bacterial activity to produce methane, with the residual processed sludge continuously withdrawn from the process. This is then offered to a sludge thickening process to further minimise the volume, then mechanically dewatered before disposal.
- The methane gas generated in this process is collected in a biogas container, and then used as fuel in a combined heat and power unit. This provides heat to ensure that the anaerobic digestion process is maintained at the optimum temperature.
- Two more combined heat and power units provide sufficient energy so that the tannery is entirely self-sufficient in electrical power and heat.

The operation has more recently included the digestion of waste from the nearby village using another organic digestion plant. The additional volume is providing additional gas via a pipeline for sale to other companies in the area, too, and it is intended to heat the swimming pool that is used by the local community.

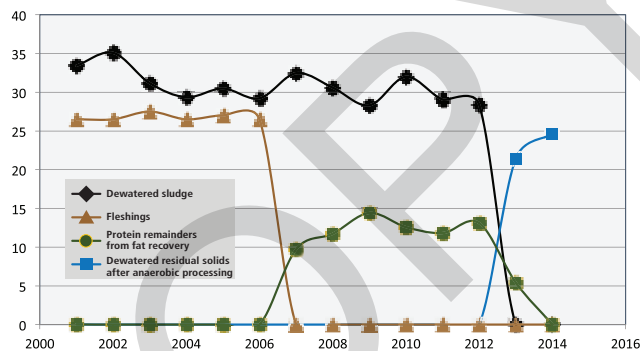


The anaerobic digestion plant is located approximately two kilometres from the Südleder tannery shown in the image.

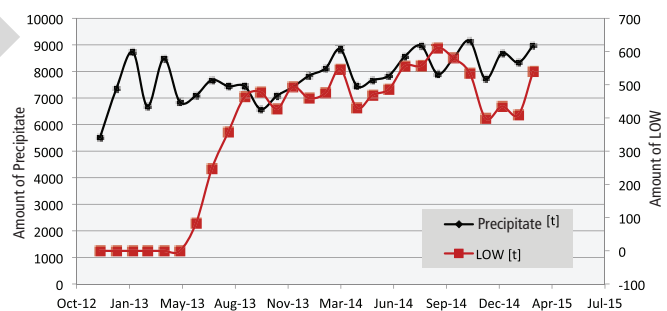
More than two years operational experience shows that the original company objectives are being met, with the CO₂ emissions being reduced by approximately 10,000 ton/annum. The performance details are given in Panel 2. 🌱

Panel 2: Bioplant operational experience

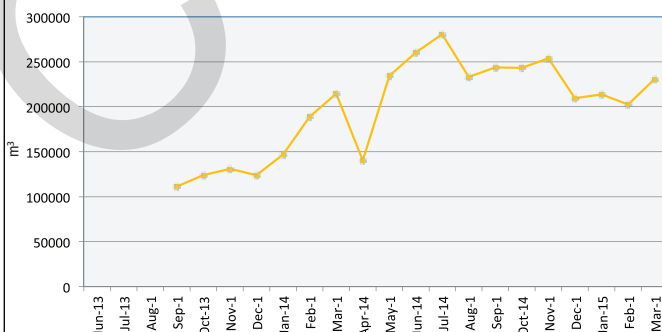
Annual waste to be disposed of compared to hide input



Monthly input of precipitates



Monthly biogas production



Gas quality

