OPTIMISED SPRAY DRYING FACILITY INCREASES CAPACITY AND GENERATES SAVINGS

Glycom in Esbjerg produces lysine, an amino acid used in pig and poultry feed. Part of the production involves an energy intensive spray drying facility. Glycom analysed the facility and the process and found that they could save energy and improve capacity.

Glycom, Esbjerg

Production
Lysine, an amino acid used in pig and poultry feed

Initiative
Process and operations optimisation of spray drying facility

Result
Annual savings of 90,000 m^3 of natural gas and 100 MWh of electricity

Economy

26 %	90,000 m^3
Increased capacity	Annual natural gas savings
100 MWh	1 year
Annual electricity savings	Simple pay back period

The result

- Annual savings of 90,000 m^3 of natural gas
- Annual savings of 100 MWh of electricity

How much did it cost?

Total capital investment was DKK 300,000 (EUR 40,000). This results in a simple payback period of 1 year.

Why was the project carried out?

Lysine is produced through fermentation. Part of the product is dried into a powder, first by using an evaporator and then a spray drying facility. The spray drying facility is the unit in the production process with the highest energy consumption.

Glycom therefore analysed the operation of the facility as well as the processes before and after spray drying. The aim was to increase capacity and reduce energy consumption.

How was the project carried out?

The spray drying facility itself has a low energy efficiency of 50-60 %. Glycom therefore examined whether it was possible to increase the temperature in the raw material before processing in the facility. The raw material is preheated using a heat exchanger with an energy efficiency of 90-95 %.

The issue was whether the raw material could tolerate a higher temperature in the preheating process, and it turned out that a temperature increase of 10 °C was safe. The raw material is therefore now heated up to 75 °C instead of the previous 65 °C before being processed in the spray drying facility.

Skills of operators upgraded

Moreover, Glycom trained operators to control the facility according to indicators for energy consumption per kg powder. The indicators are updated every five minutes and indicate whether the product has been over-dried.

The operators can react by examining the dry matter content of the powder from the facility. If the dry matter content is too high, the facility is over-drying the product, and the operators turn down the heat. If the dry matter content is not too high, the operators can systematically go over other reasons for the increased energy consumption, including nozzle pressure, airflow, temperatures, etc.

Training, logging and developing guidelines take place continuously and help to optimise and stabilise operations.

Fewer bottlenecks mean greater capacity

Capacity has increased because Glycom has removed bottlenecks in the spray drying facility. This means that the system for handling and transporting the powder from the facility has been developed, and a plant to remove particles from the discharged air – a wet-scrubber – has been revamped to let more air through.

What were the results of the project?

It was possible to increase capacity from 2.7 tonnes of powder per hour to 3.4 tonnes of powder per hour. Moreover, Glycom has achieved stable operation of the facility with a low permanent energy consumption of 0.7-0.75 kWh per kilogram of powder. Previously, energy consumption fluctuated between 0.7 kWh and more than 0.9 kWh per kilogram of powder.

Total energy savings are 90,000 m^3 of natural gas and 100 MWh of electricity.

The investment of DKK 300,000 (EUR 40,000) includes a heat exchanger, training, and refurbishment of the wet-scrubber and the powder transport system. This results in a simple payback period of 1 year.

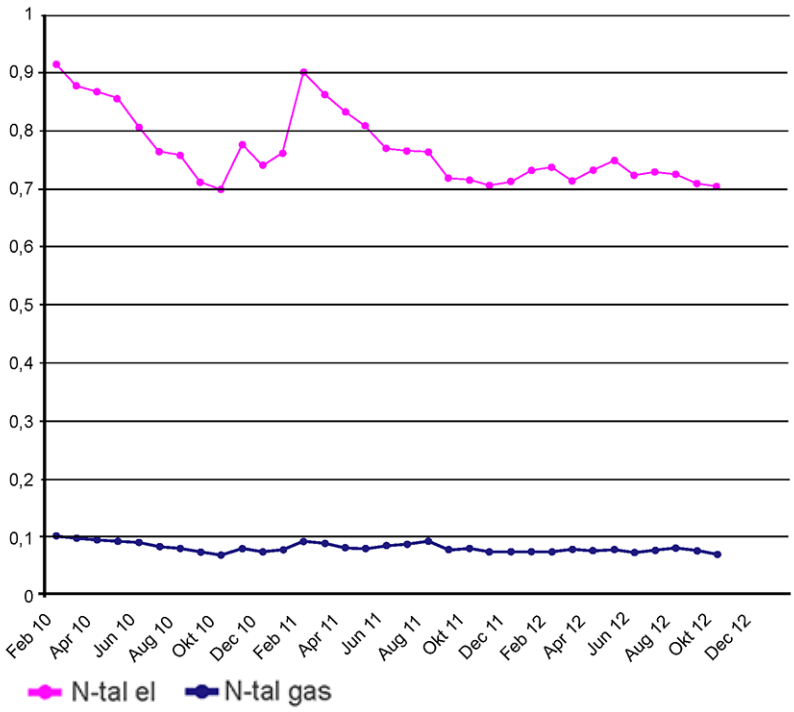

Figure 1: The figure shows the savings in gas consumption per tonne of powder at Glycom since preheating was introduced in September 2010. The figure also shows that Glycom has achieved stable operation with permanent low energy consumption since they began training their operators in spring 2011. In February 2011 there were trials to increase capacity and therefore there was a brief increase in energy consumption.

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