CASE STUDY

# Biogas Plant Fed Solely By Scotta-Whey

- **Project**: Moro Dairy Farm
- **Location**: Treviso, Italy
- **Capacity**: 180 ton/day of scotta-whey
- **Solution**: Anaerobic Digestion Plant (500 kW)
- **Technology**: Anaerobic Digester CSTR, Biogas Scrubber

## Background

Latterie & Caseificio Moro S.r.l is a dairy and cheese factory in the northeast of Italy. The factory was established in 1978 with the production of national and international award-winning Italian cheeses.
In the mid '90s, the factory was renovated to increase production.

Today, the company produces milk and a wide variety of local cheeses (e.g., ricotta cheese), with widespread distribution throughout central and northern Italy. Moro products are also used by the most important Italian agro-food industries.

## Challenges

Though initially used as pig feed, the suffering pork market and decreasing number of piggeries required a disposal solution for the scotta-whey. Even with a Wastewater Treatment Plant (WWTP), Moro dairy farm lacked a cost-effective disposal method for the scotta-whey.

This was a considerable problem due to the high costs and strict environmental regulations involved. Additionally, Fluence faced the challenge of providing a solution that did not interfere with operation of the existing aerobic plant.

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## Solution

Thanks to thirty years of experience in biogas production and after successful pilot tests, Fluence has created a solution to generate biogas with a high index yield, taking into account both economic and structural needs of the client.
A new anaerobic digestion area was added that renewed the existing purification plant in order to treat both dairy wastewater and the scotta-whey after anaerobic fermentation, without interrupting operations of the existing plant. Four years after the first plant was built, the customer turned to Fluence again to upgrade the anaerobic area by adapting the existing biogas desulfurization system and with a modification to the technology used without structural changes to the existing work. The upgade was necessary due to the increase in the flow rate, which rose from 105 to 180 tons/-day.

## Process Description

The scotta-whey first undergoes anaerobic fermentation. Once it has been digested, the exhausted scotta (the "digestate") is separated into its solid and liquid components. The solid part of the digestate (with a solid concentration of 17-18%) is disposed of in agriculture.

The liquid part is sent to the existing aerobic treatment plant, which has been upgraded to handle the higher nitrogen load. Anaerobic fermentation abates much of the organic carbon contained in the scotta-whey but leaves the nitrogen content unchanged.

## Project Data

| | Quantity (ton/d) | Methane Production ($Nm^3/h$) | Electrical Energy (kWh/d) | | Thermal Energy (kWh/d) |
|---|---|---|---|---|---|
| Scotta-whey | 180 | 138 | 12000 | | 12500 |
| **Entry data - aerobic treatment** | | | | | |
| | Quantity ($m^3/d$) | COD (mg/L) | Nitrogen (mg/L) | | Phosphorus (mg/L) |
| Dairy wastewater | 150 | 2000 | 63 | | 9.3 |
| Liquid Digestate | 170 | 1300 | 350 | | 20 |
| **Exit data - aerobic treatment** | | | | | |
| | Quantity ($m^3/d$) | COD (mg/L) | $N\text{-}NO_3^-$ (mg/L) | $N\text{-}NO_2^-$ (mg/L) | Phosphorus (mg/L) |
| | 320 | 80 | 10 | 0 | 5 |

## Conclusions

Biogas represents a great opportunity for energy- efficient growth and for the development of a sustainable national economy. The anaerobic digestion process can also be effectively applied to whey, buttermilk, and other dairy by-products.
Whey, in particular, can yield demineralized whey, powdered lactose, and other value-added products with alternative technologies, including demineralization, ultrafiltration or chromatographic separation. Fluence applies anaerobic digestion to whey byproducts in order to realize 100% of the dairy farm's potential.