

CASE STUDY



Biogas Plant Fed Solely By Scotta-Whey

- **Project:** Moro Dairy Farm
- **Location:** Treviso, Italy
- **Capacity:** 105 ton/d of scotta-whey
- **Solution type:** Anaerobic digestion plant (300 kW)
- **Technology used:** Continuous-flow Stirred-Tank Reactor (CSTR digester)

Our highly innovative and technologically advanced solutions provide great opportunities for dairy farms to maintain sustainable businesses. Because biogas plants use biodegradable wastes as feedstock for anaerobic digestion, companies can save money while meeting national and European waste recycling regulations. Moreover, the anaerobic digestion produces not only biogas, but also digestate,

consisting of leftover indigestible material and dead microorganisms; these are excellent sources of organic fertilizer and can be substituted for additional mineral fertilizers, reducing greenhouse gas emissions. Within this sector, the use of biogas creates new applications for dairy farms, such as high-tech process energy, effective small-scale power generation, flexible energy production, and more.

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.

CASE STUDY • Biogas Plant Fed Solely By Scotta-Whey

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.

Solution

With thirty years of experience in biogas production technologies and successful pilot testing, Fluence provided a solution to generate biogas with a high-yield index, while considering Moro's economic and structural requirements.

Fluence refurbished the existing WWTP in order to treat both the dairy wastewater and the scotta-whey after the anaerobic fermentation, without interrupting the existing plant's operation.

Project Data

	Quantity (ton/d)	Methane Production (Nm ³ /d)	Electric Energy (kWh/d)	Thermal Energy (kWh/d)	
Scotta-whey	105	1882	7200	7320	
INPUT DATA – AEROBIC TREATMENT					
	Quantity (m ³ /d)	COD (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	
Dairy Wastewater	150	1700	63	9.3	
Liquid Digestate	103	1300	550	1	
OUTPUT DATA – AEROBIC PLANT					
	Quantity (m ³ /d)	COD (mg/L)	N-NO ₃ ⁻ (mg/L)	N-NO ₂ ⁻ (mg/L)	Phosphorus (mg/L)
	253	<120	15	0.2	<6

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.

Conclusion

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.