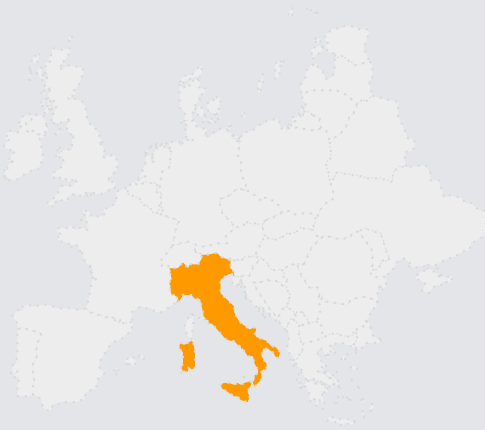


Hubgrade

PERFORMANCE

CASE STUDY | Nosedo WWTP - Italy, Milan

1,250,000 PE



THE CLIENT

Nosedo Wastewater Treatment Plant (WWTP) is Milan's main wastewater treatment plant. It has a capacity of 1,250,000 PE with full nitrification and denitrification and is the largest plant in Europe having up to the 70% effluent fully for agricultural purposes.

- 432.000 m3 treated a day
- 5 m3/s treated during dry weather
- 15 m3/s during rainy events
- 60% to 70% of the treated water is directed to agriculture



THE PROBLEM

Andrea Aliscioni COO Milan Water Service, MM SpA, reveals 'The main characteristics of Nosedo Plant is the **big volume of water treated that is reused** for agriculture; Nosedo WWTP is one of the best examples of water reuse in Europe. Our challenge is to guarantee every time **the best condition for the water reuse.**'

That is why wastewater is treated 'not only according to environmental directives, but also for the possibility to have a **circular use of the water**' explains Francesca Pizza, process manager at Nosedo WWTP.

THE ACTION

Hubgrade™ Performance is a **holistic digital solution** composed of a suite of intelligent software solutions for **real-time optimization of process performance**. It provides a state-of-the-art auto-pilot to optimize the whole wastewater system, including sewer network and treatment plant.

Hubgrade™ Performance focuses on real-time automated optimization of the consumption of energy and chemicals, biological and hydraulic capacity enhancement, stable operation and compliance of wastewater treatment plants and sewer networks.





KEY FIGURES

The Performance Guarantee analyses led to the following results (last 2 years average):

- **CO₂ savings (~ 2 100 T CO₂-eq/year)**
 - Electricity: 1 300T CO₂-eq/year
 - Chemicals fabrication: 200T CO₂-eq/year
 - Transportation: 100 T CO₂-eq/year
 - Effluent charge: 500 T CO₂-eq/year
- **OPEX savings (~ 1 200 k€/year):**
 - Energy savings:
 - Biology: 0.431 -> 0.323 kWh/kg COD removed
 - Grit Chamber aeration: 50 -> 45Hz
 - Chemical savings: - 58% of FeCl₃ - 3.01 -> 1.28 kg FeCl₃/kg P-removed
 - Chemical sludge reduction: - 106 tSS/year red. due to less precipitant

Guaranteed savings: 400k€ => +70%

- **Effluent quality**
 - 27% reduction of tot-N in effluent - from 6.9mg/l to 5.04mg/l tot-N
- **Increased hydraulic capacity**
 - During wet weather: 20 - 30%

The Hubgrade™ Performance Plant package for Nosedo WWTP includes the following features:

- DO & Nitrogen Removal
- Mixer (denitrification tank)
- Air Supply, Blowers, Grit Chamber Aeration
- Return Activated Sludge & NO₃-recirculation
- Solids Retention Time
- Standby (biological lines)
- P-precipitation

NB: We did not integrated the potential Italian carbon tax (60€/tonne of CO₂ - OECD). Which would add another 120k€ per year of extra savings.

CLIENT BENEFITS

Why Hubgrade Performance

- Having a system that can integrate the operation of the sewer system and the WWTP.
- Gaining significant OPEX savings from energy, chemical and sludge reduction.
- Handling the high load variations with a full overview and less manual adjustments.
- Achieving higher hydraulic capacity in biology, giving a better handling of wet-weather events.
- Having high flexibility for future plans (to also cover the whole Milan sewer system).

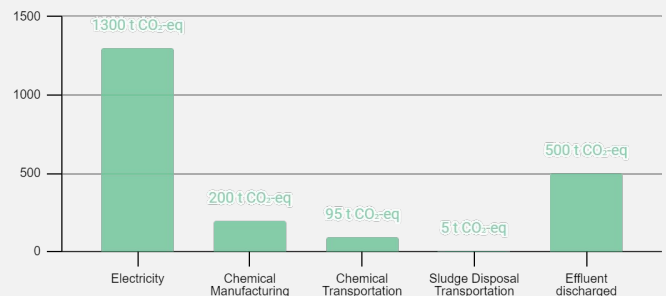
Additional client benefits

- Important CO₂ eq reduction thanks to the various savings.
- SMART Bio-P: Introduction of significant biological phosphorus removal in existing process volumes in a WWTP not designed for it

One of the most significant challenges WWTPs have to face is, according to Francesca Pizza, **gaining as much control as possible of the biochemical process**. With 40% of the total plant energy consumption, it is “the most demanding [process] from an energy point of view”.

Hubgrade Performance allows “Operators [to] have an instrument to make real time decisions on the process” Francesca Pizza, process manager in Nosedo WWTP says.

Carbon Footprint Reduction



Potential additional features

To support the enhancement of the hydraulic capacity:

- Stormwater with Rain / Sewer Measurements
- Max. Flow, inlet biology

“

‘Hubgrade Performance [...] boosts our performance by increasing the hydraulic capacity during wet weather. It is a smart solution with a high effect.’”

Andrea Aliscioni, COO Milan Water Service