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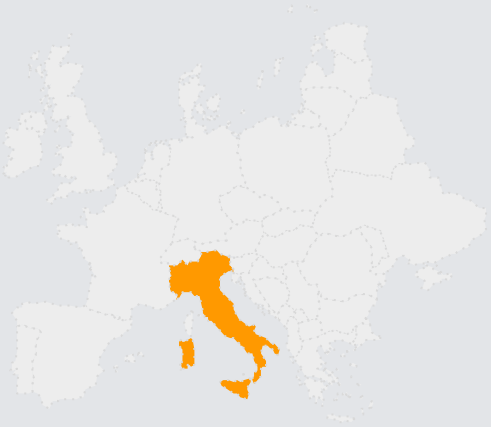
PERFORMANCE

CASE STUDY I Nosedo WWTP - Italy, Milan



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 m^3 treated a day**
- **5 m^3/s treated during dry weather**
- **15 m^3/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.

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KEY FIGURES

- **OPEX savings (approx. 630k€/year):**
  - Energy savings:
    - Biology:
      - 0.431 -> 0.323 kWh/kg CODrem considering the sum of the consumption of the following sections:
        - Aeration
        - Mixing
        - Return activated sludge
        - NO3-recirculation
    - Grit Chamber aeration
  - Chemical savings:
    - P-precipitation, - 80% of FeCl3
      - 3.01 -> 0.69 kg FeCl3/kg Prem
  - Chemical sludge production:
    - 126 tSS/year red. due to less precipitant
- Increased hydraulic capacity during wet weather: 20 - 30%
- Stable operation, less manual adjustment

The Plant package for OPEX savings at Nosedo WWTP (1,250,000 PE) includes the following features:

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

The following additional features will further support the enhancement of the hydraulic capacity:

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

CLIENT BENEFITS

Why Hubgrade Performance: deciding factors

- Having a system that can integrate the operation of the sewer system and the WWTP.
- Obtain significant total average operational savings from reduced energy consumption, chemical consumption and sludge production.
- Better handling of the large biological load variations together with a better process overview and less manual adjustments.
- Achieve more hydraulic capacity of the biological process, giving a better handling of wet weather situations.
- Future plans include the possibility of expanding the solution to also cover the whole Milan city sewer system.

Additional client benefits

- 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.

'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

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