

Who is SISLtech?

SISLtech, founded in 2009, specializes in advanced control solution design and implementation for WWTPs. Market leader whose client list includes heading international utility companies, SISLtech maintains a global presence implementing the **atl** advanced control solution in more than 100 WWTPs worldwide.

Summary

Barcelona Baix Llobregat WWTP (Spain)

- Large plant
- Plug flow reactor
- Nutrient and carbon requirements
- Diffused aeration

Challenge

To reduce energy consumption whilst maintaining organic matter and nutrient quality requirements.

Results

- 100% quality requirements
- 41 % reduction of the aeration system energy costs

Plant characteristics



Aerial view of Barcelona Baix Llobregat WWTP



Air supply to the biological reactor of Barcelona Baix Llobregat WWTP

- **Flow:** 420,000 m³/d
- **Biological reactor:**
 - Plug-flow configuration
 - 2 lanes
 - 1 lane for nutrient removal
 - 1 lane for carbon removal
 - 12 units (6 units/lane)
- **Aeration system:**
 - 5 turbo blowers
 - 1,200 kW/turbo blower
- **Aeration strategy before atl platform implementation:**
Aeration strategy based on pressure and oxygen measurements
- **Effluent discharge consent**
 - Turbidity < 15 NTU
 - TSS < 35 mg/L
 - COD < 125 mgO₂/L
 - BOD₅ < 35 mgO₂/L

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Implemented technical solution

Instrumentation

Installation of N-NH₄/N-NO₃ probes with ion selective measurement

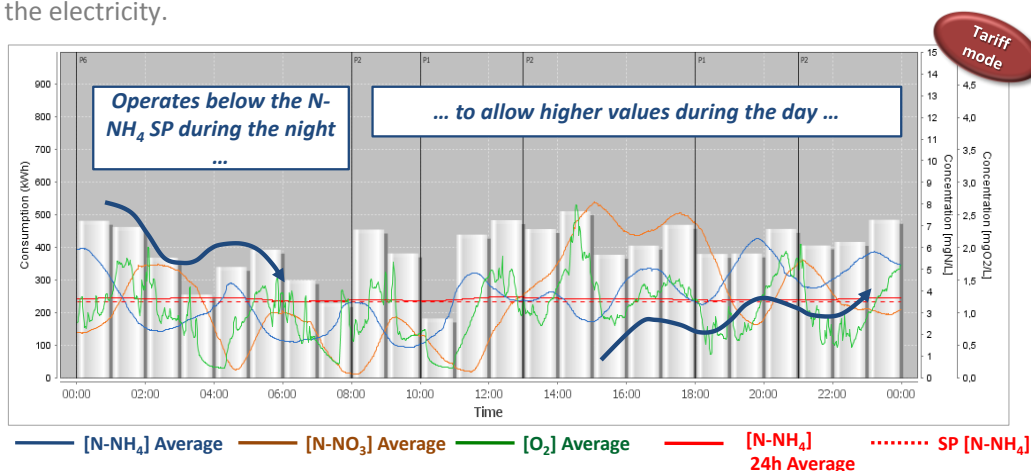
Nitrogen and carbon removal advanced control

The **atl** platform was installed with the **sica**, **nutri** and **c** modules working independently in the two treatment lanes.

Intelligent air production and distribution: **sica** module controls air equipment to maintain desired pressure levels and regulate valve opening degrees to guarantee oxygen concentration in aeration tanks, applying pressure strategy to ensure better system efficiency.

The platform works with two different strategies, depending on the objective of the treatment lane:

- 1) **Carbon removal, c module:** the oxygen set points are established based on real-time monitored turbidity level at the outlet of the biological treatment.
- 2) **Nutrient removal, nutri module:** legislation requires the plant to limit average nitrogen values achieved through two different configurations:
 - **Real time control** that establishes the air set point based on the ammonia concentration at tank outlet.
 - **Tariff strategy control** where the system modifies the momentary ammonia set point according to the price of the electricity.



Results and benefits

- The **aeration supply** has been adjusted to the influent load, and therefore **optimised**.
- The plant **complies with both carbon and nutrient discharge and reclamation requirements** as a result of **real time control** of nutrient concentration and turbidity level.
- The **tariff strategy** has boosted night-time energy consumption to reduce N-NH₄ concentration and increase energy savings during the day.

100 %

Treated water quality guaranteed

35 %

Reduction of the aeration system energy consumption

41 %

Reduction of the aeration system energy costs

43 %

Reduction of the ration of kWh consumed/kg of COD removed

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