![Createch - intelligent control solutions 360°]

Medium plant for nutrient removal
Blowers and turbines

SERZEDELO WWTP (Portugal)

Createch360° provides an operational intelligence platform for water and wastewater facilities that supports smart monitoring, advanced process control and decision making to reduce operational costs, enhance reliability and achieve quality consent limits.

With over 150 installations implemented by our teams worldwide, experience and continuous innovation guarantees high added-value solutions enabling utilities and industrial users to achieve maximum efficiency and best performance.

SUMMARY

Serzedelo WWTP (Portugal)

- Medium plant
- 2 biological lines
  - 4 Plug flow reactors
  - 2 Carrousel reactors
- Nutrient removal

Challenge

To **reduce the aeration costs** whilst **ensuring the effluent quality**.

Results

- **100%** quality requirements
- **13%** total plant energy savings

PLANT CHARACTERISTICS

Serzedelo WWTP - Global view
Photo by *Francisco Piqueiro*

- **Design Flow:**
  - 40.697 m³/d (271.313 P.E.)

- **Biological reactor:**
  - 4 Plug-flow units (Serzedelo I)
  - 2 Carrousel units (Serzedelo II)

- **Aeration system:**
  - Plug flow line: 6 turbines/ reactor (25 kW/Ut)
  - Carrousel line: 2+1 radial blowers (400 kW/Ut)

- **Effluent discharge consent:**
  - TN < 15 mgN/L
  - TSS < 35 mg/L
  - COD < 125 mgO_2/L
  - BOD_5 < 25 mgO_2/L
  - TP < 10 mgP/L

- **Measurement equipment:**
  - DO in bioreactors
  - $N-NH_4^+$ in bioreactors
  - $N-NO_3^-$ in final effluent
 - Turbidity in final effluent

Serzedelo WWTP
Serzedelo 1 site

Serzedelo WWTP - Serzedelo 2 site
Photo by *Francisco Piqueiro*

CREApro® PLATFORM - CONTROL MODULES IMPLEMENTED

N-CONTROL (intermittent cycles)

How does it work?

This module is based on **N-NH$_4^+$**, **N-NO$_3^-$**, **NTU and DO** to optimise:

a) DO levels to achieve the effluent quality requirements (**Dynamic DO SP strategy**)
b) **Blowers working frequency** and performance
c) **Turbines performance** (Nº of equipment activated and rotation management according to engines energy efficiency)
d) **Nitrification/Denitrification cycles** duration based on nitrogen removal rates
e) **Energy cost** via a tariff strategy (figure 3), taking into account this variable, and using it to displace energy consumption peaks (effluent quality requirements are based on a 24 hour average value of nitrogen)


Figure 1
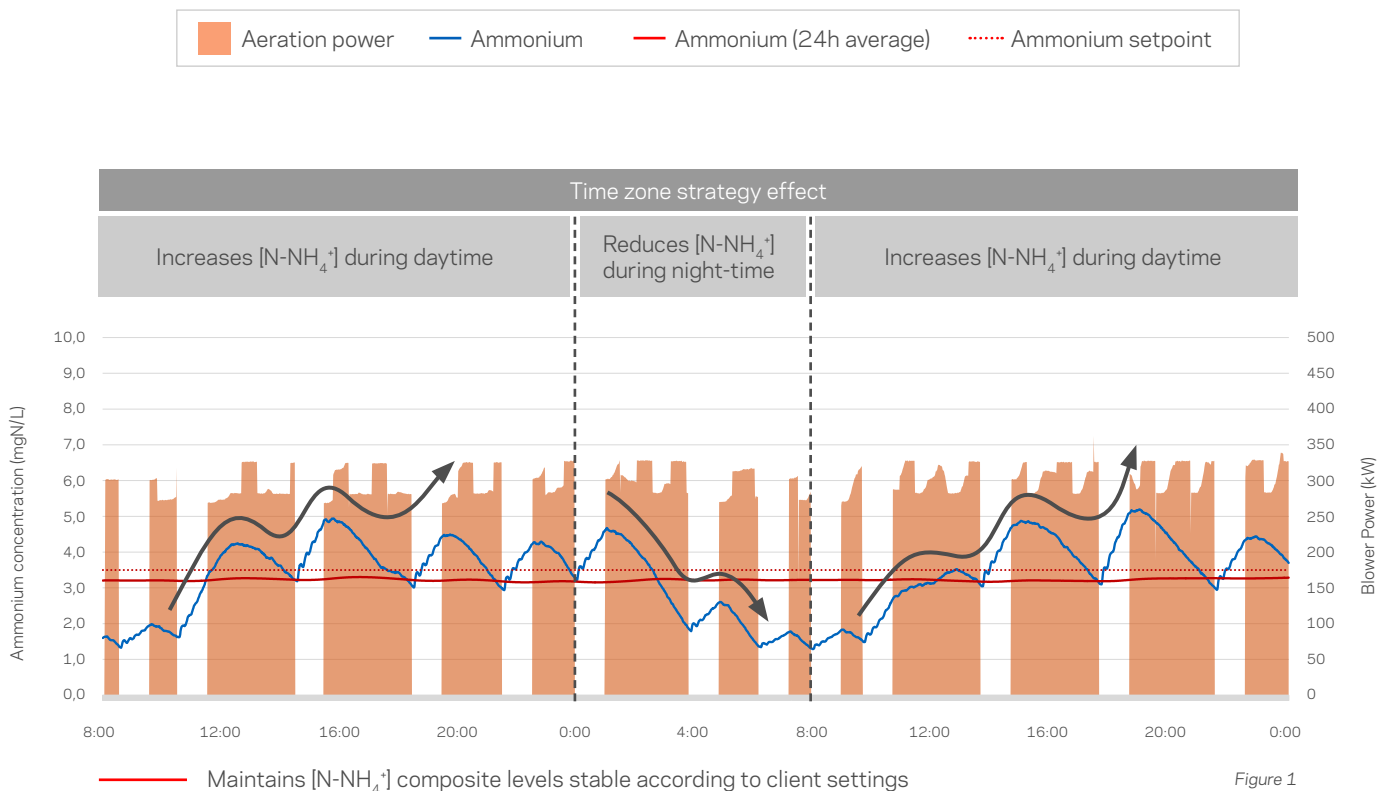
RESULTS

This section presents the differences a reference period (January 2013 – April 2015) and a period of 28 months operated with the control platform.

Inlet load

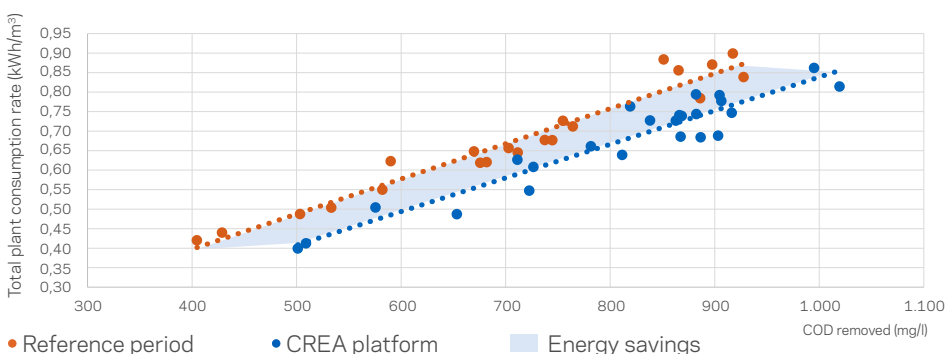|	Reference	CREA platform	Difference
Treated flow (m³ / month)	1.016.021	976.733	-4 %
Treated load (kgDQO / month)	743.005	845.948	14 %
Treated load (kgN / month)	39.964	53.297	33%

Data provided by the client; TRATAVE.

Average effluent quality
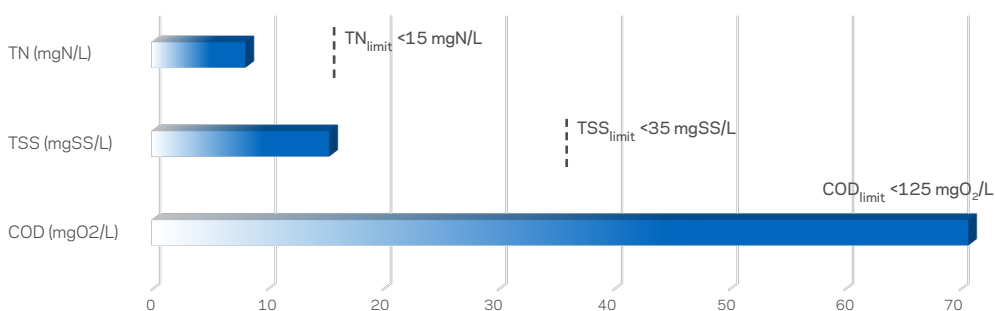
Data provided by the client; TRATAVE.

Performance

Consumption baseline agreed with the plant manager before the project began.

● Reference period   ● CREA platform   ▨ Energy savings

Data provided by the client; TRATAVE.

Energy and sustainability KPIs

	Reference	CREA platform	Difference
kWh / month	754.946	658.516	-13 %
kWh / month (only aeration)	377.473	281.042	-26 %
kWh / m³	0,773	0,700	-9 %
kWh / kgCOD removed	0,973	0,855	-12 %
kWh / kgN removed	16,186	14,373	-11 %
GHG emission (Tn CO_2 / month)	228	199	-13 %

Data provided by the client; TRATAVE.

100%
Effluent quality compliance

26%
Aeration energy savings

13%
Total plant energy savings

100%
Robustness and reliability

Medium plant for nutrient removal
Blowers and turbines

SERZEDELO WWTP
(Portugal)

CLIENT CONCLUSIONS

Claudio Costa
GENERAL MANAGER TRATAVE
TRATAMENTO DE ÁGUAS RESIDUAIS DO AVE, S.A.

"The platform has been installed in 5 plants within the project, and the investment cost has been 0,00€ for us . The project has been financed by Createch360 *, and savings sharing has allowed direct benefits.*

Each solution is fully customized to each facility, which has produced savings from day one. As soon as the project finishes, 100% of the savings will be for us!"

Createch360°
intelligent control solutions