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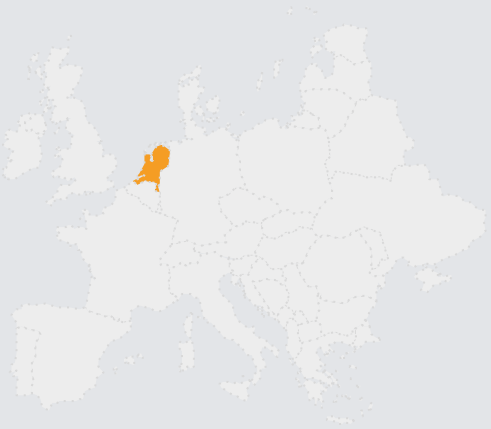
PERFORMANCE

CASE STUDY I EDE WWTP - The Netherlands 300,000 PE



THE CLIENT

Ede is a 300,000 PE (People Equivalent) WWTP located in the central Netherlands and operated by the Dutch water board Waterschap Vallei en Veluwe. The plant consists of two process lines.

- **40.000 m³ treated a day**
- **BioDenipho design**
- **2 process tanks in each line (total volume: 36,000 m³)**
- **6 secondary clarifiers with a total surface area of 9.225 m²**
- **Chemical dosing for Phosphorus Removal**

CARBON FOOTPRINT

CAPEX SAVINGS

MUNICIPAL MARKET

THE PROBLEM

Over a number of years, the WWTP experienced an increased plant load and was **not able to comply** with EU's effluent standards.

A further **load increase of 20 percent** was expected, which meant that Waterschap Vallei en Veluwe would have to extend the plant by a **third process line** or find another way to optimise the plant capacity and increase treatment efficiency.

THE ACTION

In order to **avoid a costly extension** of the plant, we have helped them to implement our online control with focus on optimisation of the **biological treatment capacity**: formerly named STAR.

This system is a **holistic digital system** composed of a suite of intelligent software solutions for **real-time optimization** of process efficiency: called now Hubgrade™ Performance.

Hubgrade™ has now **replaced the former PLC-based online control** and provides an global overview in a web-browser user interface.

This resulted in the required plant expansion being achieved with online control combined with one of Veolia's other technologies, Hydrotech filtration (disc filter), for **final polishing before discharge**.

CLIENT BENEFITS

Why Hubgrade Performance

Hubgrade™ Performance Plant has helped Ede WWTP to achieve highly satisfactory results within a short period of time, and in a most cost-efficient way.

- Higher hydraulic capacity.
- Total-N and Total-P were reduced to a level well below EU's effluent standards - even during the winter period.
- All this without dosage of external carbon, despite challenging wastewater with low carbon/nitrogen ratio.
- Significant OPEX savings from energy, chemical and sludge reduction.

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KEY FIGURES

The analyses we made since 2011 amd led to the following results:

- **Increased hydraulic capacity**
  - By more than 10%
- **Effluent quality**
  - 44% reduction of Total N (12.1->6.8)
  - 60% reduction of Total P (1 -> 0.4)
- **CAPEX savings:**
  - One extra line not built so far
- **OPEX savings:**
  - Energy:
    - Aeration
    - Mixing
    - Recirculation
  - Chemical
- **CO_2 savings**
  - Electricity
  - N_2O produced in biology
  - Chemicals
  - Effluent charge

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

- DO & Nitrogen Removal
- Mixer
- Air Supply
- Grit Chamber Aeration
- Return Activated Sludge
- Solids Retention Time
- P-precipitation

NB: We did not integrated a potential carbon tax (60 €/tonne of CO_2 - OECD). Which would add other extra savings.

In total, the investment related to the plant extension was significantly lower than if a conventional extension of process volume had been chosen. With lots of extra OPEX savings

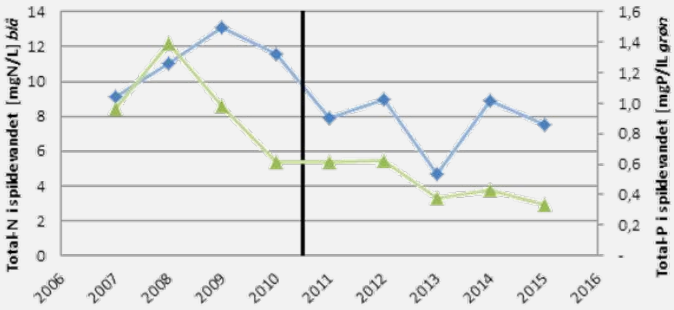
Additional client benefits

- Since 2020 important $CO_{2\ eq}$ reduction thanks to some new features tackling N_2O emissions.
- The system works 24/7 and provides set points for automation on a continuous basis. Always adapting to the actual load no matter if it is high or low.

Potential additional features

Further to our more than 10 years of experience with EDE there is always room for extra benefits.
To support the enhancement of the hydraulic capacity:

- Stormwater forecast and optimisation
- Sewer View



Results measured the first 5 years showing the impact on the effluent quality knowing that the load increase by 10% during this period

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