BIOFACTORY®

BONEO Stage 4 (State of Victoria)
Modernization of the water recycling plant

2025-03-31

Reusing water and energy with Australia's first Biofactory®

The Boneo water recycling plant, owned by South East Water and located on the Mornington Peninsula, serves an area ranging from Safety Beach to Portsea. This region, highly appreciated as a holiday destination, requires efficient and environmentally friendly water recycling infrastructures to meet the increasing population and the carbon neutrality goal of the state of Victoria.

Client objective

The State of Victoria, pioneer of the Net Zero Emissions by 2050 legislation, aims to reduce carbon emissions across all sectors. South East Water Corporation plans to reduce its emissions by 45% by 2025 and achieve carbon neutrality by 2050. The Boneo plant modernization project promotes growth, environmental protection and the production of recycled water on the Mornington Peninsula through energy-efficient infrastructure.

Towards
net zero emissions

Our solutions

In 2017, the John Holland SUEZ Beca joint venture won the DBO contract for the modernization of the Boneo plant, including the construction of new infrastructure, and the modernization of existing assets on site, as well as operation for 10 years. Our innovative approach supports South East Water's efforts to reduce emissions and improve service capacity for present and future needs.

The plant has been transformed into a Biofactory® thanks to the integration of numerous innovations:

- Biological treatment of low-carbon effluent **CLEARgreen® Mainstream** to increase the nitrogen load treated by the plant, while recovering more carbon and producing more green energy.
- Two metal digesters **Digelis® Simplex** in stainless steel Verinox®**.**
- Economical and effective treatment of ammonium-loaded digestion residues **CLEARgreen® Sidestream**.
- Advanced dewatering unit **Dehydris® Twist** incorporating a piston press, which improves sludge dewatering levels by 30% compared to existing centrifuges and has prevented the need to double the existing solar drying line.

Benefits

Our design improves reliability and water quality and optimizes the construction footprint of this Biofactory®. A plant creating new sources of revenue from water and biosolids, energy recovery and nutrient recovery.

The integration of innovative solutions has enabled us to:

- **Reduce operating costs,** by decreasing the energy and chemical costs associated with wastewater treatment.
- **Reduce carbon footprint** by increasing production of biogas used to generate electricity.
- **Minimize energy consumption** by reducing the plant's dependence on grid electricity by 30 to 40%.

16 000 m³/day
of class A recycled water
protect the local environment and maximize the production of recycled water for local businesses

Differentiation factor

SUEZ has implemented an innovative sustainability and green energy project based on a 30-year DB and O&M strategy. The project aims to maintain total nitrogen levels in the water at 8 mg/l and maximize carbon redirection, helping South East Water move closer to its carbon reduction target. Selected via a unique interactive tender, this project is a model for environmental initiatives worldwide.

suez

Boneo Stage 4, Advanced Water Recycling Plant

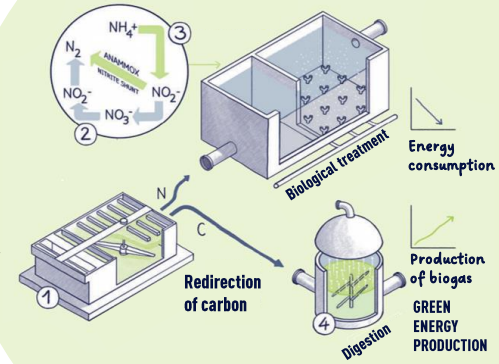
The plant's modernization in details

WATER LINE

- **Pre-treatment and primary treatment:** water intake, new emergency storage lagoon, two new chemically enhanced primary settling tanks (Densadeg®).
- **Secondary treatment:**
  - New anoxia basin, modernization of two bioreactors, with nitrate shunt (CLEARgreen® Mainstream), Unused carbon is captured upstream by reinforcing primary treatment, then redirected to digestion to produce additional biogas and reduce carbon footprint.
  - New biological treatment using fluidized fixed cultures (Meteor® MBBR).
- **Tertiary treatment:** multi-point treatment including Ultrablue® ultrafiltration, UV disinfection and chlorination, to achieve Class A recycled water.

CLEARgreen® Mainstream

Energy-efficient carbon and ammonia removal



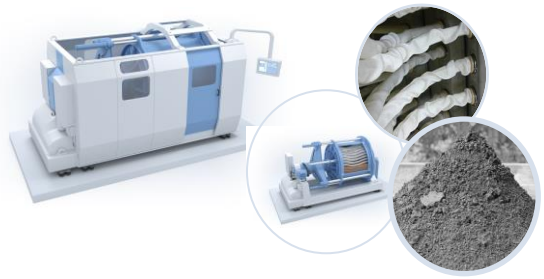
Nitrite bypass to reduce oxygen consumption and increase biogas production.

SLUDGE LINE

- **Sludge thickening:** addition of two Drainis® GDD mechanical thickeners.
- **Anaerobic digestion:**
  - Addition of two Digelis® Simplex steel digesters (using LIPP technology), designed without welds or bolts. These digesters are built from coils of spiral-wound steel blades assembled automatically using an innovative, **patented double-fold system**. This folding system guarantees the reactor's perfect watertightness over time and reduces lead times.
  - New separate gas storage, gas booster and cogeneration unit.

A unique construction method :
fast, efficient and flexible

- **Dewatering:** implementation of Dehydris® Twist advanced dewatering, based on the proven technology of the Bucher Unipektin piston press. This fully automated process combines the efficiency of a plate filter press with the productivity of a centrifuge.



- **Deamonification of digestion returns** with our CLEARgreen® Sidestream process (elimination of nitrogen overload).
- **Solar drying** (Heliantis® type).

ODOR CONTROL

The new plant also features sophisticated odor controls to ensure that nearby residents are not affected by the smell of wastewater.

CONTRAT TYPE
DBO
Design, Build & Operate
(including 10-year O&M period)

CONSTRUCTION PERIOD
2018-2022

GLOBAL PLANT CAPACITY
up to **31,200** m³/day
(high season)

SUEZ Engineering & Construction
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