Danish Dairy Plant reduces water abstraction by 90%

NALCO Water
An Ecolab Company

CASE STUDY – FOOD & BEVERAGE
CH-2091E

SITUATION

This Danish Dairy Plant is one of the largest mozzarella cheese manufacturers in the world. The Plant has made a commitment to drive sustainability initiatives across their organization. This customer's main objective was to reduce their impact on the climate and environment, by optimizing total cost of operation. By identifying and implementing plant projects focused on water and energy reduction strategies, they prioritized and fixed the following 2020 goals:

- Reduce energy and water consumption used in production, by 3% per year.
- Reduce greenhouse gas emissions from production and transport by 25%.
- Convert 50% of energy consumption used in production to sustainable sources.
- Reduce milk wasted in the production process.

In support of their sustainability initiatives, two of Ecolab's divisions, namely Food & Beverage and Nalco Water collaborated to conduct a Total Plant Assessment (TPA) of the Dairy Plant. Following this, Nalco Water proposed a plan of action using 3D TRASAR™ Cooling Water Technology which succeeded in delivering the following results:

CUSTOMER IMPACT	eROI℠	ECONOMIC RESULTS
36.865 m^3/year water saved	WATER	90% reduction in waste water abstraction for cooling systems. Delivered more than 2 times water saving than the annual target of 3 %
Net cost savings € 2.359 / year	COSTS	Some of the cost savings from reduced water use was offset by cost increase due to discharge of increased volume of effluent to the waste water plant

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

APPROACH

This Dairy Plant produces 76.100 tons of mozzarella cheese per year from raw milk. To support the production, 521.897 m^3/year water was drawn from a local borehole. The plant also produces 436.968 m^3 of membrane permeate (cow water) annually and reuses 51.5 % of it in the factory. The plant operates their own waste water treatment facility which processed 595.773 m^3 of water per year. In support of their sustainability initiatives, the customer took the decision to engage Ecolab's Total Plant Assessment (TPA) team to complete an assessment at their milk processing plants. Ecolab's TPA team members are chosen based on the specific areas of expertise required for the selected facility where the assessment is to be conducted.

During the TPA investigation, Ecolab uncovered 14 individual opportunities to help the plant reduce water and energy consumption, and the waste loading on the effluent treatment plant. 11 of these opportunities were evaluated as priority 1 & 2 projects.

One of the projects identified was the reuse of the waste water, after the Membrane Bio Reactor (MBR) treatment, as makeup for the cooling systems. It was estimated that around 35.000 - 40.000 m^3/year of water could be saved.

Picture: 3D TRASAR Controller

SOLUTION

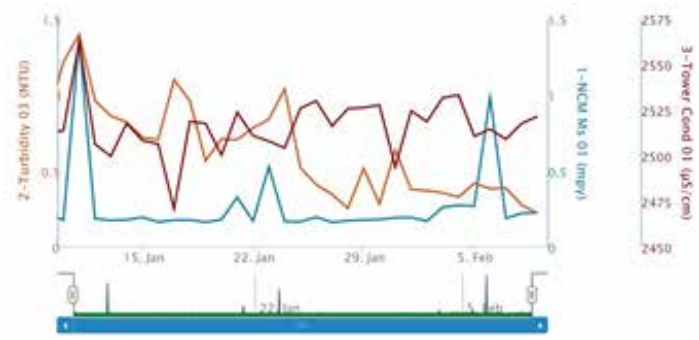
Previous situation:

- More than 400.000 m^3 of cow water (membrane permeate) was treated by a Membrane Bio Reactor equipment and discharged to the river. The water quality discharged to the river was good: less than 20 ppm COD: very low organic contaminant and no minerality.
- Cooling tower makeup water: 40.150 m^3/year of well soft water was used as makeup water in the cooling tower.

Together with the plant's personnel, Nalco Water worked to carry out a full Mechanical, Operational, Chemical and Sustainability (MOCS) audit, focused on the Cooling Tower systems. They concluded that:

- Water from the MBR could be reused as a makeup for the cooling systems
- 90% of the well water used as a makeup for the cooling tower, could be saved.

3D TRASAR Cooling Water Technology delivers on-demand control and optimization of the cooling system and of the water chemistry, continuously protecting the system from corrosion and scale formation. Moreover, the system was connected to the System Assurance Center (SAC) to ensure that Nalco Water Experts could continuously monitor the system and respond to any system variances and alarms. Immediate alarm response leads to faster problem identification and improved system operations, saving water and energy, while making efficient use of chemistry.



Graph: Monitoring of the key parameters

RESULTS

The implementation of the waste water reuse project using 3D TRASAR Cooling Water Technology delivered the following results:

- Reduced cooling tower makeup by 90%, amounting to 36.865 m^3/year soft water saved and a saving of € 8.479/year (0.23 €/m^3)
- 36.865 m^3/year of water saved represented 7.1 % of the annual water consumption, thereby delivering more than 2 times the amount of annual water saving target which was set at 3 %
- Reduced waste water discharge to the river by 36.865 m^3/year allows for more flexibility in the discharge quantity: the site is limited to 2.250 m^3 per day discharge and any daily excess discharge is sent to the municipal sewage works at an extra cost of 0.78 €/m^3

CONCLUSION

The customer trusts in Ecolab, as a reliable partner both in expertise and services.

The TPA audit team, made up by members of Ecolab's Food & Beverage and Nalco Water division worked to successfully identify water and energy projects aligned with the customer's corporate sustainability initiative.

This first project (waste water reuse in cooling systems) resulted in reducing the annual water consumption by 7.1 %, allowing it to exceed its annual water saving goal.

Nalco Water recommended the implementation of its 3D TRASAR Cooling Water Technology along with the antiscale/anticorrosion, oxidizing biocide and biodetergent treatment programs to more accurately manage the system parameters.

The combination of problem-solving approach gained via the TPA, on-site expertise, and the application of innovative technology, delivered significant improvements in sustainability performance. Nalco Water has succeeded in minimizing the water savings, maximizing the operational results and optimizing the total cost of operations at the Dairy Plant.

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