Global Inventory for Blue Green Good practices and Integrated Solutions (GIBGIS)

Case: **Water Loop Factory: turning cosmetics waste water into reusable water**

Location: L'Oréal Warsaw plant, Poland

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Topic: Waste water treatment, recovery and recycle by reimagining water cycles into operations.

Sustainable Development Goals:

- SDG 6 (Clean Water and Sanitation),
- SDG 9 (Industry, Innovation and infrastructure),
- SDG 12 (Responsible Consumption and production)
- SDG 13 (Climate action)

About the Project:

The game-changing water reuse installation is an essential part of the cosmetics production process conform the high hygiene and safety procedures, enabling L'Oréal to make their operations more sustainable and lower their environmental footprint at the same time. The installation started operations in 2020 and has a treatment capacity of 400 m^3/day from factory cleaning water. This high-end installation allows water reuse of approx. 75.000 m^3 per year. Nijhuis Saur Industries provided the technology, engineering and manufacturing complemented the contract with the turnkey civil works, local permitting, soil remediation, 3D design, supervision installation, commissioning and operation, directly at the L'Oréal Warsaw plant.

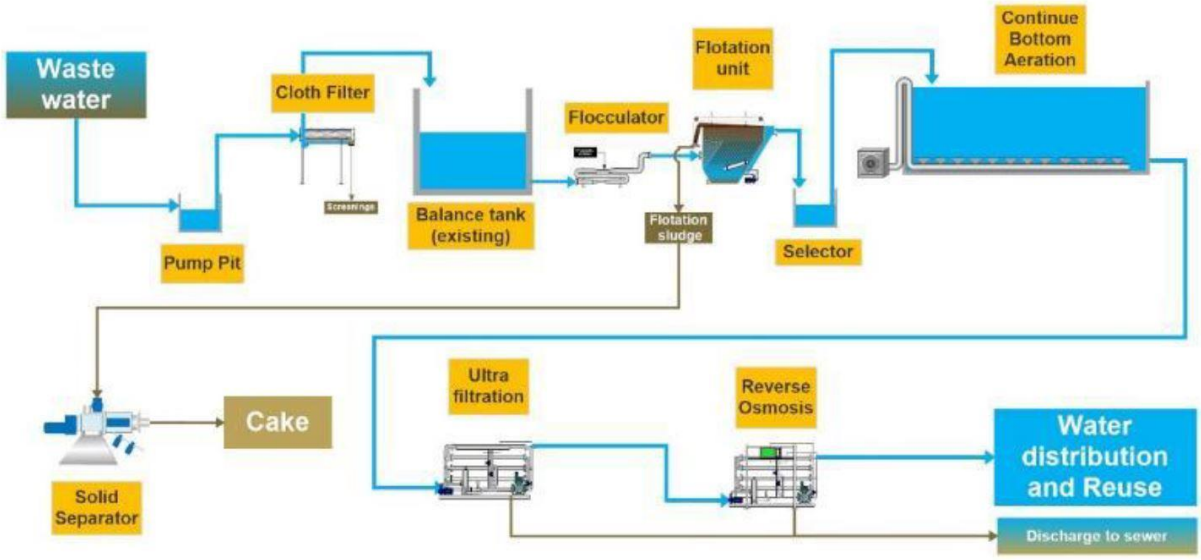
Project Objectives:

1. Reducing water consumption by 60% per finished product in 2020 (using a 2005 baseline by L'Oréal).
2. Making L'Oréal operations more sustainable and lowering the environmental footprint.
3. Optimizing water efficiency by going further and reimagining the water cycles entirely

Process of installation and treatment:

Nijhuis Saur Industries designed a complete water treatment solution which covers the civil works and technology, including all stages of treatment: filtration, buffering with 2 buffer tanks, chemical pre-treatment by using different chemicals corresponding to wastewater quality using flocculation & flotation system, sludge treatment from flotation sludge, biological treatment MBR type with external membranes, a complete reverse osmosis system to produce clean water, disinfect and distribute the water inside the factory.

Before execution of the project, Nijhuis Saur Industries did an extensive pilot research including the processes described in below flowchart. Based on the pilot result, all parties were convinced to choose the proposed set-up.



Justification of the project:

L'Oréal has committed to a 60% reduction in water consumption, per finished product, by 2020 (using a 2005 baseline). The installation dramatically reduces the water consumption by 50%, originally provided by the municipal water treatment from city. The water which was formerly used for the L'Oréal Warsaw operations, is now available for other applications. As Poland is one of countries where water scarcity already impacts the environment and industrial operations, L'Oréal Warsaw plant is acting as a real game-changer together with the support of Nijhuis Saur Industries.

Due to water reuse used for the cleaning of manufacturing tools and additional co-production processes (for example, cooling), the average recovery rate of water is around 50%. The main project task was to recover as much water as possible which is to be used in the factory.. The installation is an essential part of the cosmetics production process conforming with the high hygiene and safety procedures, enabling L'Oréal to make their operations more sustainable and lower their environmental footprint at the same time.

Process of implementation:

Team involved: L'Oréal and Nijhuis Saur Industries acted as partners, and secured external experts assistance during all steps of the projects, including health and safety, construction and installation phase. Nijhuis Saur Industries delivered all the turnkey installation and commissioning of the project, acting as consultant, technology provider and EPC contractor for the civil works and supervision. Mainly all technologies are complemented into one unit, either via sub suppliers are complete manufacturing by Nijhuis Saur Industries.

Novel approach in cosmetic industry: Since the project has been successfully executed and reaches the plant performance, the treatment set-up can be adapted to other local situations. By directly reusing water from treated factory cleaning water, fresh water consumption can be reduced. Water recovery is one of the key parts of the circular economy. The efforts from L'Oréal as multinational and frontrunner to invest in such a system, will set a standard in the cosmetic landscape. The more multinational companies and factories will do it, the better the economic feasibility can be achieved for small and medium enterprise companies.

*Is Water loop Factory concept currently in function?: T*he L'Oreal Warsaw Plant, after realisation of Water Recycling Station will implement the second phase of sustainable development and become a 'Waterloop Factory'. It means that fresh water will be used only for sanitary use and process water for bulk production. The other water demand will be covered by the water coming from treated water via WRS and discharges from Reversed Osmosis.

Why is it a game-changer?: The combination of proven high-end technologies within the set-up for this cosmetic factory and the very clean and state-of-the-art water reuse installation plant, makes it a real game-changer. Additionally, cosmetic production represent a very fragile and delicate market. This project proved that via water reusing, a significant impact can be made to reduce the environmental footprint and follow the corporate L'Oréal goals. The implementation of the newest technology with a proper organisation, including O&M services, ensured special added-value services.

Challenges in implementation:

Difficult construction conditions: Nijhuis Saur Industries managed L'Oréal goals by erecting the entire system in a very limited plot limited from 3 sides by existing tanks, buildings and the plot fence. Not only did the building and tanks fit in the small area but on top of that represent a visual add-on to the factory landscape. The glass window façade of the building represents L'Oréal and Nijhuis Saur Industries combined commitment not only to the environmental impact but also beauty and aesthetics. At the same time, the construction did not affect normal activity of the production plant.

Challenging time-scale: As L'Oréal Warsaw Plant is an operational plant it was necessary to coordinate all works with the existing functioning of the factory. The plant was finally built and commissioned without any halts in production and wastewater discharge. To improve the execution and coordination, the entire technological project was executed in 3D.

COVID-19 posing challenges: A lot of work had already started before April/May 2020 when the pandemic related regulations became strict. In addition, Nijhuis Saur Industries and L'Oréal both companies took special care and measurement for H&S including covid. All additional measures like temperature measurement, masks, planning works for teams and others were secured by L'Oréal Warsaw Plant.

Environmental issues in drought-prone region: Other than high fresh water consumption, cosmetic wastewater contains hard degradable contaminations. Due to treatment, for the largest part of the process, the discharge of treated water to the sewage treatment plant is avoided. The main challenge was to meet the discharge limits to sewer from the brine, but this has been overcome.

Energy footprint of the project:

• High efficiency of pre-treatment system reduces the contamination of wastewater treated through biological MBR system, results in lower power consumption of the aeration system.

• The same effect is done by highly efficient control of the oxygen and other parameters in the virological system**.**

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