Technical tour of the JOURDAIN water purification unit

Context

On the west coast of France, in the Vendée region, a vast majority rely on limited natural water resources such as surface water dams (55 million m3 of total storage capacity). This situation has challenged the region year after year during summer because of depleting rainfall, high evaporation, low natural winter refills and increasing demand (with peak summer demand directly driven by tourism).

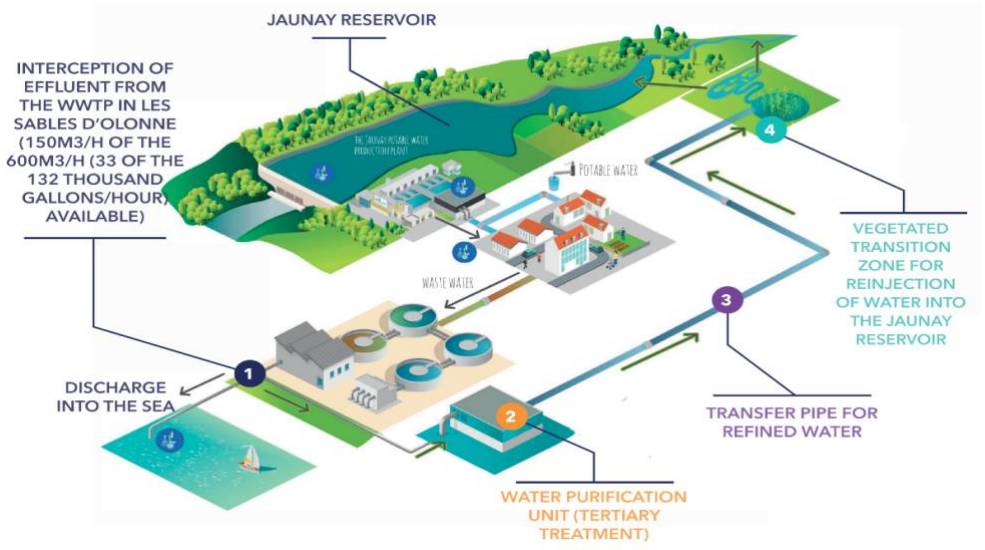
Consequently, Vendée Eau, the territory's public utility responsible for drinking water production and distribution in Vendée, has been investigating options for securing its water resources since the 2000s. Significant improvements have been made to existing assets by reducing network water losses, in addition of improving water savings, enhancing interconnections and winter water storage in former quarries.

To complement these conventional solutions, Vendée Eau needs to go further. The reclamation of large volumes of treated wastewater, currently discharged into the open ocean, represents a very significant potential for supplementing surface resources.

JOURDAIN, IPR demonstrator in Vendée

Vendée Eau decided to carry out the first stage of experimentation and demonstration to assess the adequacy of this solution before considering full-scale implementation. The demonstrator, named JOURDAIN, between the Sables-d'Olonne wastewater treatment plant and the Jaunay reservoir, consists of three components (see illustration below):

- a water purification unit (close to the WWTP) [1] and [2],
- a pumping station and a 27km transfer pipe [3] from the purification unit to the reservoir,
- a vegetated buffer zone (artificial wetland) to diffuse discharge into the reservoir [4].



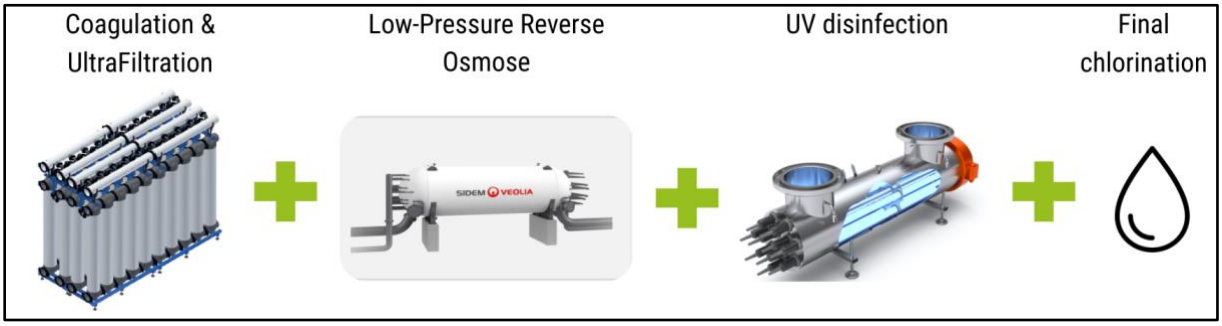
In order to capture progress in all aspects of the project, the demonstration unit will be running for a 4-year period, with the capacity to treat 150 m3/h of secondary effluent from the WWTP to produce high quality purified water. This corresponds to ¼ of the anticipated final full-scale plant capacity. It is expected that the demonstrator will be sending purified water back to the current SO WWTP ocean outfall for the first year (2024) of operation, before eventually releasing water to the Jaunay dam over the next 3 years (2025-2026-2027).

Vendée Eau is piloting and financing the project with support from public grants.

With a programme spread over 4 years, the Jourdain project will aim at confirming the relevance and performance to all stakeholders: end-users, regulators, politics and citizen associations.

Focus on the water purification unit and the technical tour

After a consultation process of nearly a year under an open DBO (design-building-operate) procedure, Vendée Eau selected a consortium led by Veolia for the implementation of the tertiary treatment unit. In order to meet the strict water quality requirements for this project, the process line selected is based on dual membrane filtration and dual disinfection steps (UV and chlorine):



The work was completed in the summer of 2023, and after a start-up phase, the unit has been operating since November 2023, discharging treated water into the ocean.

The technical tour scheduled for the afternoon of 25th September will enable participants to see the entire facility.

In addition, an open research and development platform has been implemented onsite, in partnership between Vendée Eau, Veolia and research and innovation institutions. Three priority axes of research have been identified with a specific focus on the Jourdain project and the future implementation of the IPR scheme with a final capacity of 600m3/h:

- optimisation of the tertiary treatment process with the assessment of an alternative treatment line
- management of RO concentrate with recovery of valuable material and protection of the ocean environment
- modelisation of the release wetland performance and impacts on ecological quality of the water.

This R&D platform will also be presented during the technical tour.