

The R3Water project: Reuse, Recovery and Resource efficiency

Water reuse in the circular economy

Traditionally waste water treatment plants (WWTP) have been considered as facilities to avoid emissions from urban and industrial wastewater to the environment. Current research and development shows that these facilities have a tremendous potential to be converted and upgraded into reliable production units of crucial resources as energy, nutrients and reclaimed water for reuse.

Reclaimed water is a key alternative water resource to be considered in the urban water cycle, especially in traditionally water stressed areas as the Mediterranean coast but not only, as water stress is envisaged to increase globally. Reclaimed water is a reliable and local water supply for non-direct potable uses, reducing pressure to the conventional water sources used to supply drinking water and preventing depletion of other strategic water resources. In WWTP without nutrient removal, reclaimed water contains valuable nutrients that support plant growth in irrigation, reducing the need for fertilizers. Reclaimed water is a key resource in the context of circular economy, bringing reliability and sustainability at a local scale.

Water reuse in Costa Brava

Mediterranean regions suffer permanent water scarcity due to the irregular distribution of rainfall, high evapotranspiration and general overexploitation of the water resources to supply demand. Consorci costa Brava (CCB) a water body in charge of managing the sanitation and bulk water supply in 27

countries of the Costa Brava (NE of Iberian Peninsula) became a pioneer water manager in 1985 when implementing water reuse schemes to supply reclaimed water for non-potable purposes to public and private users. Thus, reclaimed water has become an alternative water source capable of reducing pressure over traditional water resources and mitigate its harmful effects, increasing local sustainability. This is especially important when replacing conventional sources in large water consumers as irrigation, ensuring water supply all year round to the user (reliability) and creating new businesses as the case of golf courses in the area (Golf d'Aro 1989)



WRP of Castell-Platja d'Aro

Water reuse in R3Water

Reclaimed water must have the required sanitary quality to allow its safe use. This is first priority for the water managers responsible of the water reclamation plants (WRP). Regular sampling allows water managers to ensure that reclaimed water

quality complies with regulation. WRP are not usually equipped with on-line monitoring and control techniques to assess continuous safe water production. Innovative monitoring and control technologies specially designed address to this goal are being demonstrated within R3Water project. The selected demo site of Castell-Platja d'Aro WWTP+WRP in the Mediterranean coast of Spain with over 25 years of experience, being a pioneer WRP in Europe offers an excellent reference case at European level.

How to optimize disinfection in water reclamation; the case of doscontrol®

Disinfection processes in water reclamation plants (WRP) are strongly influenced by upstream treatment steps such as particle settling and biological oxidation, thus compromising the robustness and reliability of single disinfection barrier schemes. Therefore, multiple barrier approaches as the combination of physical (i.e. ultraviolet

light) and chemical (i.e. chlorination) disinfection methods have been adopted to enhance reliability and increase the disinfection spectrum against resistant microorganisms and specially to their spores such as *Cryptosporidium parvum* and *Giardia Lamblia*.

Within R3Water, teqma is demonstrating a control technology exclusively developed to bring reliability to the combined disinfection process in water reclamation; doscontrol®

The doscontrol system, based in advanced control strategies and on-line monitoring techniques is able to generate positive synergies by continuously adjusting the required biocide agent dosage. Data from on-site water quality and equipment status sensors is used as feed information together with operator-related settings.

Features and benefits:

- doscontrol® delivers the adjusted dose of disinfectant (physical and chemical) in order to produce safe water at the minimum cost.
- As a fully automated process, data is continuously monitored providing to the operator valuable control and knowledge on real time about the disinfection process and equipment status.
- Moreover, chemical associated risks as disinfection by products formation (i.e. Trihalomethanes and halo acetic acids) are reduced.
- The innovative system ensures a reduction in the O&M associated costs due to less chemicals and power used and needed manpower.



doscontrol® unit in Castell-Platja d'Aro WRP

Operation and maintenance:

The system provides valuable on-line information and data management for a proper maintenance management. Besides, the operator can decide to use doscontrol® or change to the previous operational mode if desired.



Preliminary results in Castell-Platja d'Aro WRP:

After a preliminary monitoring and testing phase, the doscontrol® pilot unit has shown:

- Adaptability of the disinfection process to the inlet water quality variations → reliability
- 30% to 50% reduction of the sodium hypochlorite consumption compared the conventional method of fixed flow achieving the same sanitary level by optimizing the dosage.
- Optimization of power consumption of UV system controlling nº of units ON, and power level.
- Disinfection by-products are minimized.

Links:

<http://r3water.eu/>

<http://r3water.eu/demonstration-spain/>

<http://r3water.eu/2nd-r3water-newsletter/>

<http://www.ccbqi.org/>

<http://www.teqma.com/>

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doscontrol® unit in the control room of the Castell-Platja d'Aro WRP



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tecnologías y equipos para el medio ambiente