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WATER TREATMENT RECOVERY
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CASE STUDY
- HILCASA EL SALVADOR -

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CASE STUDY #2:
WATER RECOVERY IN HILCASA - APOPA, EL SALVADOR

The following pages describe how water is recovered in one of our recent installations in central America:
Hilcasa is a textile company having one of its production sites in Apopa, a city in El Salvador. The maximum daily flow rate entering the dyeing facility is 1500 m3/d. Thanks to Idrosistem's wastewater treatment and recovery system, Hilcasa is able to reuse up to 70% of the incoming water. Here we present the system configuration in Hilcasa.

The water coming out of the dyeing facility enters a biological oxidation plant, which purifies it as to reach European limit values for discharge into the environment.

After the **biological oxidation** step, the treated wastewater can be safely discharged to the environment. However, by doing this, the company would lose a major opportunity for profit and savings. In fact, 70% of the water exiting the **biological oxidation** unit can be sent back to the starting point of the dyeing process and easily reused, upon further treatment.

In addition to drastically reducing the industry's water withdrawal from the environment, water recovery enables businesses to significantly cut down the share of costs related to raw water extraction, conditioning and purchase. Moreover, during the last years, the area where Hilcasa is located is facing a severe lack of water.

BIOLOGICAL TREATMENT

In order to be effectively reused in the industrial process, water exiting a **biological oxidation** plant must be further treated. At this stage water usually contains excessive concentration values of suspended solids, bacteria, colour and salinity, which must be decreased in order to avoid problems during the dyeing process.

Of course, the degree of treatment depends on the final use of the recovered water. Generally speaking, there are two degrees of recovered water quality, one that allows for any later use in the production facility (Agua 1), and one which is suitable for some specific uses (Agua 2).
The treatment process that enables to achieve the water quality required for recovery are the following.

- First, a **sand filter** is applied to remove practically all residual suspended solids from the water.
- Second, an **ozone** unit eliminates all bacteria and applies an initial decolouration to the water (water that has been in contact with ozone usually reaches 50 ppm PtCo units).
- The residual part of color is then removed with a **resin filter**, which also contributes to a further reduction of COD (up to -40%).

The water that has undergone these three processes, named “Agua 2” is left with only one last main pollutant: salt. However, despite the high value in conductivity, this water can be mixed with the raw water in the same percentage or be used for those applications that do not require a specific, high water quality, such as washing of printing frames, finished product containers, etc. or flushing of toilets.

EXAMPLE OF “AGUA 2” WATER REUSE

In Hilcasa, the water that has been treated with **sand filter, ozone and resin filter**, and has a high value of salinity is called **"Agua 2"** and represents an average daily flow of 300 m3/d, i.e. about 20% of the water needed for the facility. This water flows to its specific destinations through a dedicated line, which allows no mixing with the raw feed water coming from outside the factory.

If a dyeing factory wants to treat the water exiting a **biological treatment** so that it can be reused for any kind of use in the production process, it must undergo an additional treatment on top of those previously described.

- First, the water must be cleaned from all the particles ranging between the nanometer and micrometer size (proteins, viruses, emulsions, colloidal particles, gelatin, etc.) through an **ultrafiltration** unit.

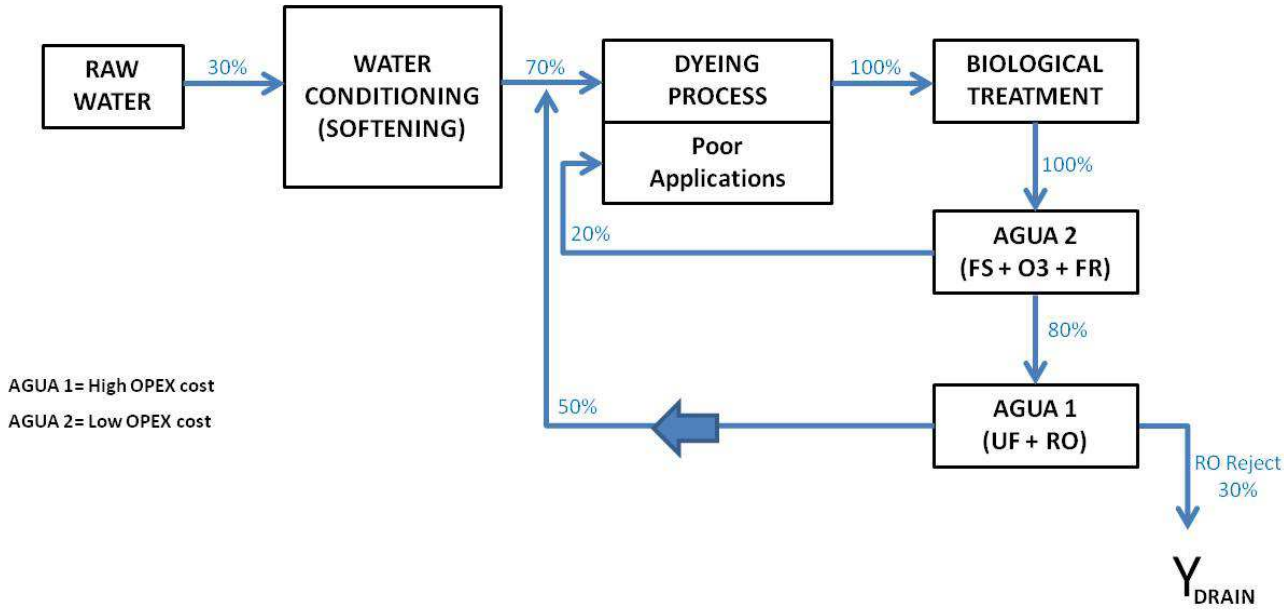
- Second, the salts and metals (ions) must be removed by means of **reverse osmosis**.

REVERSE OSMOSIS SYSTEM INSTALLED IN HILCASA

At this stage, water has been treated up to a quality that is suitable for any kind of production process. In Hilcasa, this water is called **"Agua 1",** and represents around 50% of the total water feed of the dyeing facility.

It is important to highlight that this kind of recovered water, in contrast to raw feed water, does not have to be conditioned(i.e. it does not require softening nor alkalinity removal), since it has such a good quality that can be used even on the boilers.

The figure below shows the water recovery configuration in Hilcasa.



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