CellCap Finescreen™ supported biological wastewater treatment to enhance plant capacity

The social awareness of depleting resources leads to an increase in more cautious use of raw materials and more resource recovery. Hereby, a transition is taking place from an economy of extraction, creation and discard of finite resources, towards a circular economy based on resources and products that are recycled. This circular economy is the base of the project Screencap.

Screencap is an innovative collaboration between Water Board Aa & Maas, BWA BV and KWR Watercycle Research Institute, where the impact of finescreen technique on the downstream purification processes of a large scale wastewater treatment plant is examined for a long term period.

Screencap is a collaboration of:

Waterschap Aa en Maas

BWA

KWR Watercycle Research Institute

Co-funded by the Eco-innovation Initiative of the European Union

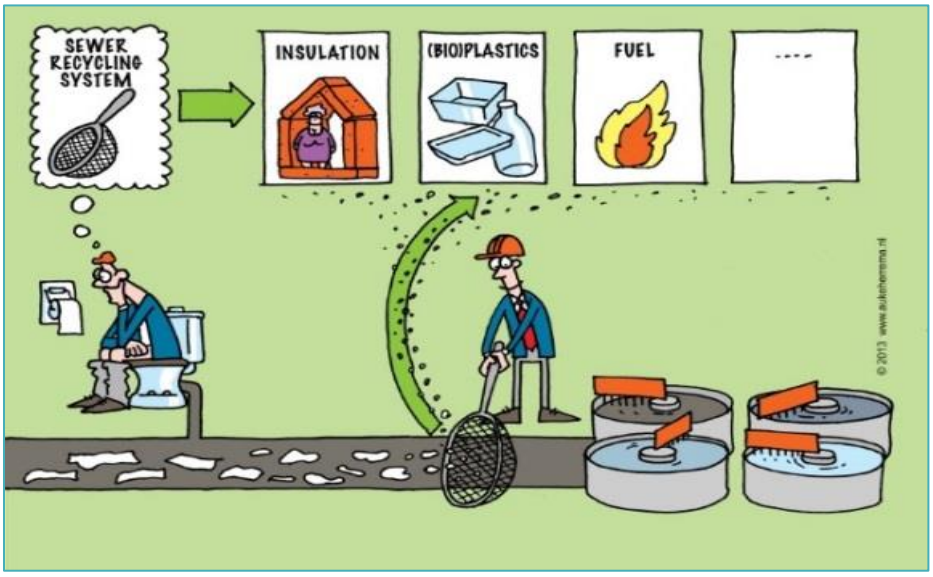
Screencap, the project

KWR, BWA and Water Board Aa en Maas enable a revolutionary change in current sewage treatment processes that offers great social- economic and environmental benefits. This change is universally applicable and can therefore be applied at almost all biological municipal wastewater treatment plants (WWTPs).

The essence of this innovative concept is the recovery of suspended solids from raw wastewater based on their particle size. Hereby a different fraction is captured than when using traditional separation techniques (a primary settling tank) that are based on the density of the particle. By focusing on the particle size, a significant positive impact on the efficiency of downstream processes can be observed. In order to employ this technique, an existing CellCap finescreen technology is adapted and optimized.

Compared to the current state of the art solutions, this concept has a number of significant advantages with an enormous impact:

- Reduction of excess sludge volume;
- Significant reduction of chemical usages;
- Reduction of aeration energy;
- Increased biogas production potential;
- Smaller WWTP footprint.



European relevance

This technology has been tested in several pilots across Europe. Most of these installations operated at a relatively small scale (demonstrating scale). In this project the concept of finescreening will be scaled up to full-scale for the first time at the WWTP in Aarle-Rixtel.

The benefit of the WWTP in Aarle-Rixtel is that the wastewater treatment consists of two independent and identical purification streets which allows/enables an objective comparison of the impact of the screening technology. After a period of time, this impact will be evaluated. The evaluation results will be internationally disseminated and published.

The CellCap Finescreen installation

The installation

Within the Screencap project, a full-scale installation will be built at a municipal WWTP treating wastewater from 240.000 people equivalent (max. 14,000 m^3/h). This WWTP consists of two identical wastewater treatment lines. Finescreens will be implemented in only one line, which allows a clear performance assessment of the impact on the wastewater treatment process by monitoring and comparing the treatment characteristics of both lines. A highly organic stream will be recovered as a resource. This resource can be reused via one or multiple valorization routes from which biogas production is the first feasible option considering today's state-of-technology. At a later stage (not part of Screencap) the organic stream can be used as a resource biobased product.

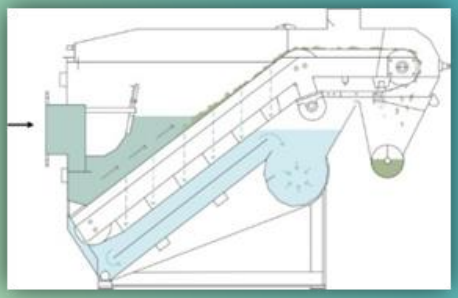
The CellCap finescreen

The CellCap Filter is designed for high efficiency solids removal from municipal and industrial wastewater streams. The finescreen is equipped with a filtercloth containing a mesh opening size of 30 to 840 microns depending on the application. The feed water is continuously fed into the unit in which the free water escapes through the mesh. The suspended solids that are retained by the mesh form a pre-coat which increases the removal efficiency by catching smaller particles. The movement of the mesh is continuously, and the speed is controlled, based on the liquid level in the unit.

The filtrate (screened water) is first collected behind the filter cloth in the frame and will be further treated in the wastewater treatment processes. The solids are removed from the filter cloth by a patented cleaning system (Airdoctor), using air pressure at the end of the filtration area.

Place in the WWTP

The CellCap finescreen installation will be placed between the sandtrap and the aeration tanks. The raw wastewater will be pumped to the finescreens. Here the water will be divided over the finescreens and float by gravity through the downstream biological treatment scheme. The basic installation will consist of eight finescreens with the possibility to expand to a final of ten machines. After the filtration, the filtered water will flow under gravity to the existing aeration tanks, while the collected screenings will be dewatered and stored. The press water will be returned to the waterline of the wastewater treatment plant.



For further information

Visit our website: www.screencap.nl or contact us:

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WAM is a Dutch Waterboard within the Meuse River Basin located at the east side of the province Noord-Brabant. The Dutch water boards (there are 24 in total) are regional government bodies that are among the oldest forms of local government in The Netherlands started by cooperation of inhabitants in the 13th century.

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With both proven and innovative technology, BWA is able to provide appropriate solutions for a large number of environmental issues. Waste recycling, re-use of materials and recovery of low-grade energy are central in basically all our solutions. Through research and collaboration BWA is looking for new ways to solve existing problems in a more sustainable and economical way.

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KWR creates top-quality new knowledge through goal-oriented research. The researchers combine this new knowledge with their own knowledge and experience already at their disposal through KWR's extensive network. KWR's research focuses on four important themes: Healthy, Sustainable, Advanced and Efficient water.

Subsidy

The Entrepreneurship and Innovation Programme is part of the larger Competitiveness and Innovation Framework Programme (CIP) of the European Union that aims to increase innovation within SMEs and increase competitiveness. This project is co-financed by the European Union, through a grant under the CIP Eco-Innovation scheme.

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