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Research area: General aims

Environmental technology // Water

Key words:

Cross-sector approach, water and energy savings, paper, chemistry, food, textile, treatment trains, technologies, less effluent, circuit closure, process stability

TITLE:

EU-AquaFit4use – Sustainable Water Use in Paper, Chemical, Food and Textile Industries; SubProject SP 5 “pilots in four different sectors” covers work package WP5.1 “paper industry”, WP5.2 “chemical industry”, WP5.3 “food industry”, and WP5.4 “textile industry”

Background/Problem area

By consuming several billion m³ of water per year, industry has a significant impact on available water sources. Legislation, stringent discharge standards as well as process and product demands force industry to ensure higher water quality resulting in increasing costs. In the water consuming industry, water is no longer regarded as a consumable or utility but as a highly valuable asset: and vital element used in close conjunction with the production processes. Industries want to become more independent of public and private parties for the supply of process water and the treatment of wastewater. Furthermore, they want to use water qualities according to their own specifications, fit-for-use.

Securing sufficient quantities of water of good quality and resources for urban, industrial and agricultural uses is a major driving force behind the current EC policy. Although Europe has extensive knowledge and experience of developing solutions in the field of water, the fragmented character of the European water sector strongly limits its potential. A focused European approach on industrial water has enormous potential in fostering technical innovations. Therefore four sectors, i.e. paper (WP5.1), chemistry (WP5.2), food (WP5.3) and textile (WP5.4) have combined their expertises by learning from each other to face this ambitious issue.

Objectives/Research results

This proposal aims to balance industrial supply-side and demand-side approaches to managing scarce water resources. In this context we are aiming to reduce high quality water consumption and fresh water needs, mitigate the environmental impacts of both water treatments and effluent discharge, and to better manage the health and safety risks relating to water use while improving product quality and process stability, reducing water related costs (intake, treatment, re-use, closed loops, discharge), increasing independency and flexibility and creating new jobs in Europe when strengthening competitiveness by ensuring the world market leadership of European water treatment technologies.

To reach these ambitious goals a new management system including new approaches, tools, methods, and technologies needs to be developed. AquaFit4Use aims at these developments focusing at cross-sector issues that concern the major water consuming industries in Europe.

Application/Economic benefits

Simulation studies in four different sectors have been successfully performed at partner factories, elaborating several scenarios for effluent reduction whilst assessing the impact of system closure on system loading. This includes predicting the impact of different integrated water resource management approaches whilst designing principles for ensuring water quality and process stability. Concepts of water circuit narrowing have been discussed, covering measures and partly also several alternatives for reducing specific fresh water consumption.

On-site pre-trials covering separation steps (flocculation, DAF, precipitation, crystallization), AOP (ozone, UV, peroxide), biological treatment (MBR, UASB, denitrator) and pre-filtration/membrane steps (3FM, MF, UV, NF, RO) are being performed. Accompanying on-site meetings of water users, water treatment suppliers and supporting research institutes are being held to prepare alternative pilots.

Thanks to all the results that have been achieved and analysed by considering the partners' specific boundary conditions, a valuable basis has been determined for carrying out SP5's pilots. The details of the pilot trials have been planned and discussed. The layout of pilot plants and corresponding treatment sequences has been fixed. For the paper sector, the following steps have been performed in a timeframe of 8 months covering: anaerobic treatment, calcium elimination & softening, MBR, ozone, evapo-concentration and membrane filtration (NF/RO). Based on the results technological and economical evaluations have been performed suggesting on a modular design tailor-made solutions for specific paper mill's boundary conditions.

Period of time: 01.06.2008 – 31.08.2012

Remarks

The integrated research project AquaFit4use (EU-FP7-ENV-211534) has been funded by the European Commission covering six Subprojects. Subproject SP 5 “Pilots in four different sectors” is coordinated by PTS in cooperation with 27 partners from 11 European countries:

11 industrial partners representing water users as model companies (global player enterprises and SME),
8 industrial partners representing water technology suppliers (global player enterprises and SME),
2 industrial federations (EUCETSA and ISPRIN),
7 institutes, and 2 universities.