Project description:

Background

The main environmental impacts from textile industries relate to the “wet process” stages of textile production. These processes use large volumes of water which are normally discharged as polluted waste water. Treatment and reuse of this water would help minimise the stress on water resources, in both qualitative and quantitative terms. By introducing improved water reuse systems the textile industry could contribute to a more rational water management policy and assist the availability of water sources for potable use. Other industries may also be encouraged to improve their processes.

Objectives

The LIFE-Environment PROWATER aimed to improve water reuse systems by demonstrating the technical and economic feasibility of treating textile waste water using physical-chemical processes and innovative membrane technologies. These were to be applied within a new waste water treatment system which aimed to significantly reduce fresh water consumption and pollutant discharge in four textile wet processes (dyeing; finishing; washing; dyeing + finishing). Findings from the LIFE-Environment project would be used to inform the content of a general operative procedures handbook for selecting and managing waste water treatment and reuse in different textile processes.
Results

The PROWATER project has successfully demonstrated that an effluent recycling system based on clarification in the form of a physical-chemical pre-treatment (coagulation + lamellar sedimentation or flotation), cross-flow ultrafiltration and ozonation is suitable for textile waste water reuse, from both technical and economic perspectives. Innovation was emphasised during the project which developed four prototypes for four textile wet industries to test different kinds of effluents using actual end-of-pipe textile effluents. The results proved to be highly satisfactory with a number of targets being exceeded. Regarding the pollution parameters for example, 62% of total surfactants were removed by the treatment process against a target of 50%. 98% of colour was removed which was significantly higher than the 85% target. All other results were in line with the original targets regarding chemical oxygen demand (COD), turbidity and total suspended solids (TSS). The system for purification and reuse tested within PROWATER was found to be valid even from the economic point of view. The proposed system is cost-effective and competitive with commercial purification processes and possible alternative solutions. 1) The comparison of the operating costs showed that: - At the four project prototypes, the operating costs of the system for each end-user range between 0.78 and 2.37 €/m³, depending on the different optimisations needed at each site; and - In contrast, the operating costs of a system using a chemical-physical treatment and a biological process for purification of textile effluents are about 2 €/m³ (Martinetti, 2006), but this system allows only limited wastewater reuse. 2) Recovery of investment costs is possible: - for a plant implementing the proposed technologies after roughly five years; or - for a plant working on an aerobic biological process followed by filtration on traditional membranes in nine years. Treated waste water was reused effectively in different production processes including fabrics softening and some washing processes. Waste water was mixed with fresh water in other processes to generate favourable outcomes and overall the project demonstrated that fresh water consumption could be reduced by 40% on an industrial scale (Supposing 500 textile industries with a total effluent production of 1,000 m³/day, the proposed treatment system could then result in a saving of 44 million/m³ of fresh water a year). This finding offers important cost saving opportunities for textile companies and other relevant industries that will be able to benefit from the handbook which was produced during the project. Enhanced cost effectiveness will help generate new employment opportunities for European industries and also improve competitiveness against low-wage textile producing countries. Reduced amounts of waste water discharged as effluent will make beneficial contributions to a number of EU Directives including: 2000/60/EC Water Framework Directive; 98/83/EC Water Quality Directive; and 96/61/EC Integrated Pollution Prevention and Control. Contributions to the latter EU Directive are particularly relevant since Annex 1 of the Directive highlights requirements for pollution control methods in the textile industry’s wet processes. Sustainability of the project results are anticipated via uptake of the new waste water treatment technology among textile SMEs and the beneficiary’s After LIFE communication plan will be used to disseminate results. This project has been awarded the title of "Best of the Best" from a shortlist of 21 "Best" LIFE Environment projects in 2007-2008.
Environmental issues addressed:

Themes

Water - Waste water treatment
Industry-Production - Textiles - Clothing

Keywords

waste water treatment, water reuse, textile industry, industrial waste water

Target EU Legislation

- Water

Natura 2000 sites

Not applicable

Beneficiaries:

Coordinator
Tecnotessile – Società Nazionale di Ricerca Tecnologica r.l.

Type of organisation
Research institution

Description
The project beneficiary is Tecnotessile S.r.l. (TTX) from Prato in Italy. The company is a well known textile research centre with strong experience of R&D in textile waste water treatment.

Partners
VIG-Rifinizione Vignali S.p.A., Italy
MAV-Tintoria MA-VI S.r.l., Italy
FIN-Rifinizione Fin-Mode S.r.l., Italy
LIT-LIT S.r.l., Italy
UIP-Unione Industriale Pratese, Italy
ENE-Ente per le Nuove Tecnologie, l’Energia e l’Ambiente, Italy
FIL-Filterpar S.r.l., Italy
Administrative data:

Project reference       LIFE04 ENV/IT/000583
Duration                01-OCT-2004 to 28-FEB-2007
Total budget            2,194,914.00 €
EU contribution         1,059,332.00 €
Project location        Piemonte (Italia) Lombardia (Italia) Emilia-Romagna (Italia) Toscana (Italia)

Read more:

Leaflet                 Title: Brochure of the project (461 KB) Year: 2008 No of pages: 6
Newsletter              Title: "Prowater News 3" (754 KB) Year: 2006 Editor: Tecnotessile No of pages: 4
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Newsletter              Title: "Prowater News 1" (510 KB) Year: 2006 Editor: Tecnotessile No of pages: 4
Poster                  Title: "Project's schema" (12.3 KB) No of pages: 1
Poster                  Title: "Project's schema" (11.4 KB)
Project web site        Beneficiary's website (IT)
Publication: Guidelines-Manual
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Publication: Layman report
                        Title: Layman report (EN/IT) Year: 2007 No of pages: 6
Video link              Best project video (6')