Background

Most water-related problems, in Europe as in the rest of the world, relate to water quantity and quality issues. To solve these problems, new techniques and concepts for the preparation and supply of drinking water and for wastewater discharge and treatment need to be developed. A more sustainable approach should consider the intended use of treated water as well as the possible reuse of nutrients. Energy consumption for wastewater discharge and treatment should also be minimized. Whilst some new techniques and concepts are available and in use, further developments are necessary to achieve a reasonable level of sustainability.

Objectives

The main goal of this project was to develop new sustainable sanitation concepts that are superior both economically and ecologically to conventional (end-of-pipe) systems. The project aimed to demonstrate that it is technically feasible to collect and treat separately three components of domestic effluent: urine, faeces and grey water.

Two technologies – based on vacuum separation and gravity separation respectively – would be installed and tested in office buildings and apartment blocks. This would enable the collection of more detailed and reliable
information concerning the design and planning, operation and maintenance and investment and running costs of the new sanitation concepts (SCST). It would also serve to test consumer acceptance of the proposed solutions and identify technical improvements, as well as making a demonstration case for interested parties.

The new sanitation concept could be used in those parts of Berlin where sewer systems are not installed, as well as other locations in Germany and abroad.

Results

The project achieved its results and was accomplished successfully. In general, both new sanitation concepts work. Compared to conventional sanitation systems, the innovative nature of the project lies in the fact that all three volumes (grey water, brown water and yellow water) are discharged separately, which in turn makes it possible to use a much bigger share of the nutrients from wastewater as fertiliser, for fertiliser production, or for biogas production. This is based on the fact that less carbon gets into the aerobic wastewater treatment – during the treatment process, about 50% of it is transformed into CO2 by the micro organisms and then released into the atmosphere.

- In principle, users accept these type of separation toilets, but both vacuum and gravity separation systems need to be improved (e.g. flushing, urine separation effect, preventing encrustations in the urine effluent).
- The tested faeces separator works for small settlements. Large deposits require a continuously working settlement.
- The treatment of grey water with a constructed wetland is very effective.
- Grey water treatment with a membrane bio-reactor (MBR) is equally effective and leads to the disinfection of the effluent.
- The constructed wetland requires a large base area; therefore, conventional wastewater treatment plants should be used for grey water treatment in large settlements. If the effluent is supposed to be disinfected and very low phosphorus effluent concentrations are intended, a MBR could be used.
- The two stage thermopile biogas plant seems to be an appropriate anaerobic process for brown water treatment, but more research has to be undertaken.
- The tested urine treatment processes are basically applicable. The process configuration steam stripping plus magnesia-ammonium-phosphate-precipitation is most favourable. With ozone, pharmaceutical residues can be completely removed from urine.
- Urine and digested brownwater (faeces plus flush water) have the same fertilising efficiency as mineral fertiliser. The fertilising efficiency of faeces compost is lower.
- The results from user, consumer and farmer surveys are encouraging, but the application of the different new fertilisers is not in accordance with current laws and directives - pharmaceutical residues in particular are a focus of discussion.
- The new sanitation concepts have ecological advantages compared with conventional sanitation systems
- Costs for the new sanitation concepts may vary considerably from case-to-case.

However, the project team also highlighted some weak points of these new
The separation rate of urine was much lower (about 30% of the total nitrogen) than the expected 70%. Technical improvements are needed. The complexity of the system description and the high dependency of boundary conditions, complicating a simple decision system and a cost comparability. There exists an uncertainty regarding legal regulations for urine as a fertiliser.

The project team considers continuing the tests for few more years.

Disclaimer: This « results » section should be considered as a draft until the Commission has completed its evaluation.

Environmental issues addressed:
Themes
Water - Waste water treatment
Keywords
domestic waste, waste water treatment, separated collection
Target EU Legislation
- Water
Natura 2000 sites
Not applicable

Beneficiaries:
Coordinator KompetenzZentrum Wasser Berlin gGmbH
Type of organisation Research institution
The "KompetenzZentrum Wasser Berlin GmbH" is an international networking company dedicated to research on water-related matters and transfer of knowhow. It is an association between the universities and research institutes of the State of Berlin and two private groups, Veolia Water and Berlinwasser. The State of Berlin supports the KompetenzZentrum Wasser with a view to promoting the sustainable development of the city.

Partners
Anjou Recherche, Paris, France
Berliner Wasserbetriebe, Germany

Administrative data:

Project reference: LIFE03 ENV/D/000025
Duration: 01-MAR-2003 to 31-DEC-2006
Total budget: 2,223,474.00 €
EU contribution: 465,635.00 €
Project location: Berlin (Deutschland) Brandenburg (Deutschland)

Read more:

Project web site: Project's website (DE/EN/FR)
Publication: After-LIFE Communication Plan
Title: After-LIFE Communication Plan (EN)
Year: 2006 No of pages: 2
Publication: After-LIFE Communication Plan
Title: After-LIFE Communication Plan (DE)
Year: 2006 No of pages: 2
Publication: Layman report
Title: Layman report (EN)
Year: 2007 No of pages: 10
Publication: Layman report
Title: Layman report (DE)
Year: 2007 No of pages: 10