



The need and challenges for sustainable and cost-effective wastewater treatment in rural and sub-urban areas in Bulgaria

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WECF

Women in Europe for a Common Future

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Sustainable Water and Sanitation Projects

by WECF & Partner Organisations in the EU and the EECCA region



Belarus

Our partner organisations:
ECOPROJECT PARTNERSHIP



Monitoring activities in well water with school pupils

Ukraine

Our partner organisations:
BISWC, BAMA, DE VOEDINGSTUDENTS



1) Focus on outreach in schools with urine-diverting dry toilets and 2) training on installing pumps

Uzbekistan

Our partner organisations:
MEHRIBAN



1) Urine-diverting toilet for household
2) Children from Uzbekistan

Kazakhstan

Our partner organisations:
YOUNG GUARDS OF NATURE
BICAR, YGAH



1) Installation of urine-diverting dry toilet in Kazakhstan

Azerbaijan

Our partner organisations:
EMCF



Introduction of sustainable sanitation in Azerbaijan

Kyrgyzstan

Our partner organisations:
SOCIAL UNION AKBRECHY ALGA, BICOM, CAAM, FEMK, UELGA, UNISON



1) Training on sustainable sanitation
2) and household urine-diverting toilet in Kyrgyzstan

Romania

Our partner organisations:
EMOTIELE ROMAN, FEMEI PENTRU UN VIITOR CURAT, EPIC, MEDICINA ET SANITAS, SLOBOZIA, O RO



1) Demonstration of re-use of urine in a school and 2) training on how to install pumps in Romania

Tajikistan

Our partner organisations:
ASPD, NAU, YE'ET, SAFO



1) Installation of school toilet building under construction in Tajikistan

Afghanistan

Our partner organisations:
KATA CHELL & V.



1) A new school will serve offering dry toilet for the children in Afghanistan

Bulgaria

Our partner organisations:
SARIN I OREVEK, ECO WORLD



1) Urine-diverting dry toilet with acid flow in a school centre in Bulgaria
2) Inside view of the urine-diverting toilet

Moldova

Our partner organisations:
ECOTOP, ECO-SPECTRUM, ECO-TIRAS, WISDOM



1) Urine-diverting dry toilet and 2) urine-diverting water used for a kindergarten in Moldova

Armenia

Our partner organisations:
ARWIKO, CHARITABLE WOMEN, ECOLOGIE CLUB



1) Urine-diverting dry toilet for a school and 2) water sampling from a public school tapwater in Armenia

Georgia

Our partner organisations:
FOUNDATION CAUCASUS ENVIRONMENT, GEBRAL, FOC, GREEN MOVEMENT OF GEORGIA, INDICA, KARGO, SEMA, VOGCA



1) Production of liquid fertilizer, solar production and 2) resource center for sustainable development in Georgia

- WECF receives financial support from:
- Belarusian Ministry of Education, Belarus
 - Belarusian Ministry of Environment
 - Partner: UNICEF
 - German Ministry of the Environment
 - German Federal Foundation of Environmental Education
 - International Institute for Environment and Development
 - Private: Microsoft
 - British Agency for International Development

- Water and Sanitation projects by WECF and partner organisations:
- Construction of urine-diverting dry toilets for households, public places and schools
 - Production of products in the diverting toilet
 - Construction of solar hand-wash basins
 - Demonstrating the effects of urine as a fertilizer
 - Building soil filters and constructed wetlands for treatment of wastewater
 - Monitoring of drinking water quality
 - Cleaning and construction of drinking water wells
 - Developing Water Safety Plans with involvement of schools
 - Establishment of demonstration centres for sustainable development



Women in Europe for a Common Future

Legal framework in the EU

- Urban Waste Water Treatment Directive -UWWTD (1991/271/EEC)
- Water Framework Directive - WFD (2000/60/EC)
- Guide for Extensive Wastewater Treatment Processes adapted to small and medium sized communities (500 to 5,000 population equivalents) 2001
- Integrated Pollution Prevention and Control Directive
- Nitrates Directive

Legal framework in the EU

	Agglomerations with up to 2,000 PE	Agglomerations with up to 2,000 PE having a wastewater collection system	Agglomerations with 2,000 – 10,000 PE	Agglomerations with 2,000 – 10,000 PE discharging to sensitive areas
Urban Wastewater Treatment Directive applies	no	yes	yes	yes
Requirements		Provision of a wastewater treatment system	Provision of a wastewater collection and treatment system	Provision of a wastewater collection and treatment system
Discharge requirements: Removal of		Organic matter * (BOD, COD, SS)	Organic matter * (BOD, COD, SS)	Organic matter * (BOD, COD, SS) Nutrients** (N, P)
Water Framework Directive applies	yes	yes	yes	yes
Requirements	Setting up measures to achieve a good water and groundwater status and to protect drinking water			
	=> Provision of sanitation and wastewater treatment			

* Biochemical oxygen demand [BOD₅ at 20°C]
Chemical oxygen demand [COD]
Total suspended solids [SS]

25 mg/l O₂ (70-90 % percentage of reduction)
125 mg/l O₂ (75 % percentage of reduction)
35 mg/l (90 % percentage of reduction)

Urban Waste Water Treatment Directive

- applies to settlement areas >2000 pe*)
- minimum standards for waste water treatment
- fully flexible on the means to achieve the objective, thus open to - and encouraging - innovation and alternative solutions
- alternative solutions to centralised sewerage systems permitted even within in urban settlement areas, if same level of environmental protection is achieved

*) smaller settlement areas covered by the objective of the Water Framework Directive ('good quality for all waters, as a rule by 2015')

Population in agglomerations with less than 2,000 pe in different countries

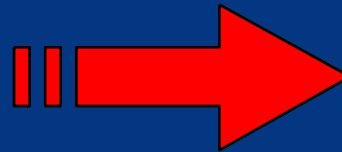
Country	pe in millions	% of total population
Bulgaria	1.9	24 %
Czech Rep.	2.7	26 %
Germany	7	9 %
Poland	15	39 %
Romania	2	9 %
Slovakia	1.7	31 %

(partly from GWP 2007)

Why do we need to manage wastewater also in rural areas?

Wastewater contains:

- Pathogens
- Nutrients
- Organic matter



(Drinking) water pollution

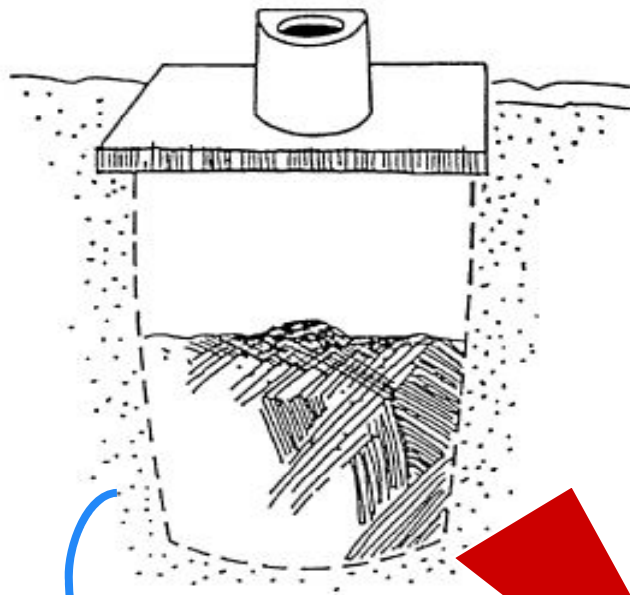


Danger for health and environment

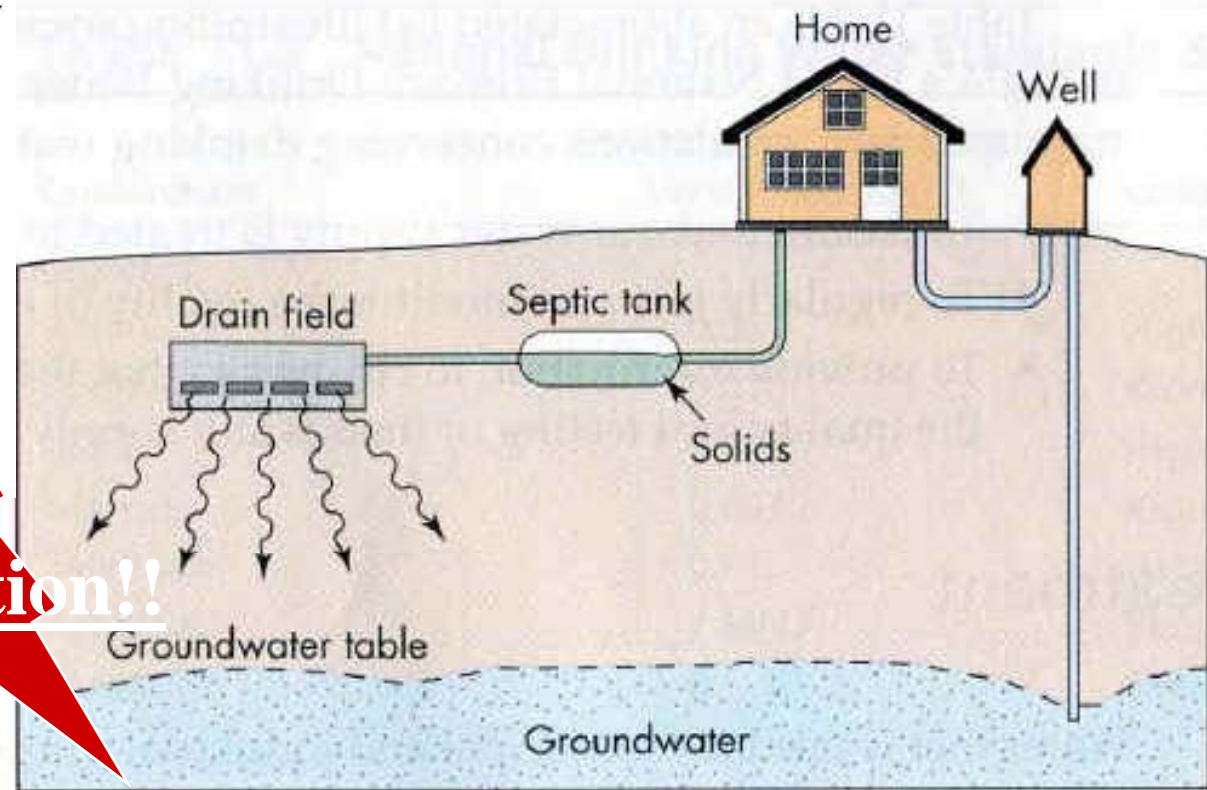


Conventional decentralised/onsite systems

Pit latrines



Septic tanks



Pollution!!

groundwater

How to make wastewater collection and treatment in rural areas successful and sustainable?

- Robust and reliable technology
- Easy to maintain and operate
- Financially sustainable
- Environmentally and climate sound
- Considered within a regional planning process

Advantages of constructed wetlands (planted soil filter)

- Good efficiency (COD, nutrient and pathogen removal)
- Cheaper than conventional technical system (operation and maintenance costs)
- Few, if any, electro-mechanical equipment
- Zero or low energy consumption
- Easy operation and maintenance
- No smell, no flies
- Natural system, esthetical look

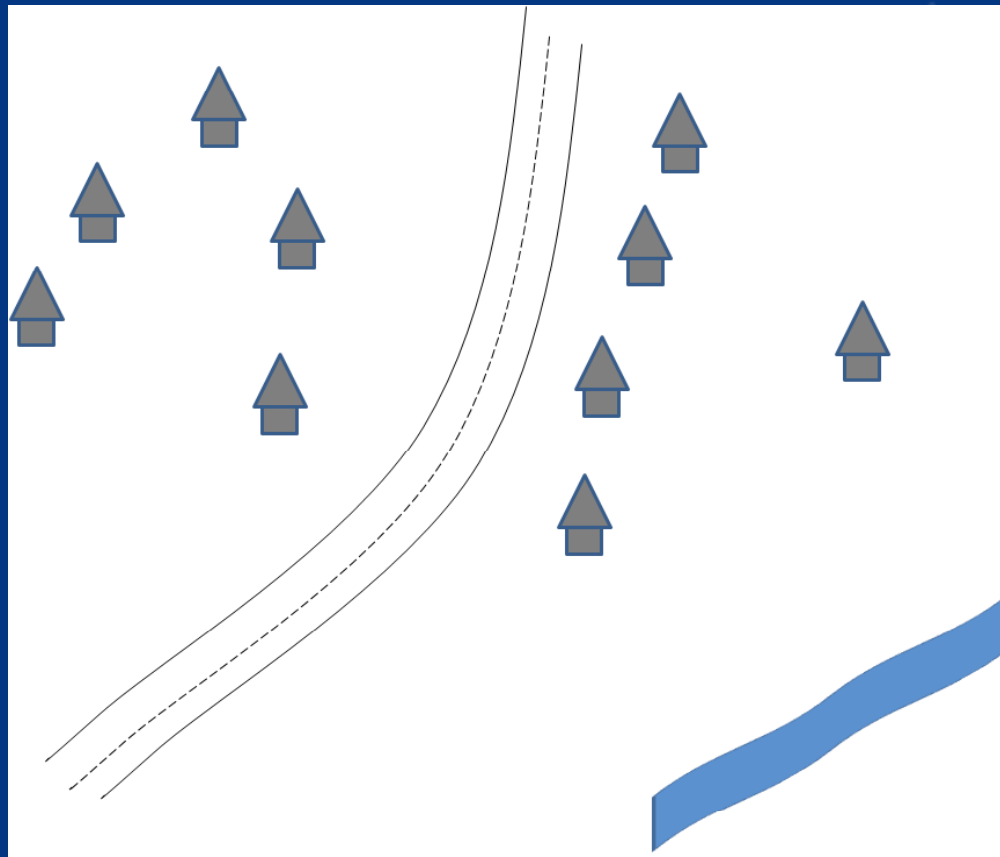
Selection of the best wastewater treatment and collection system

No solution fits all

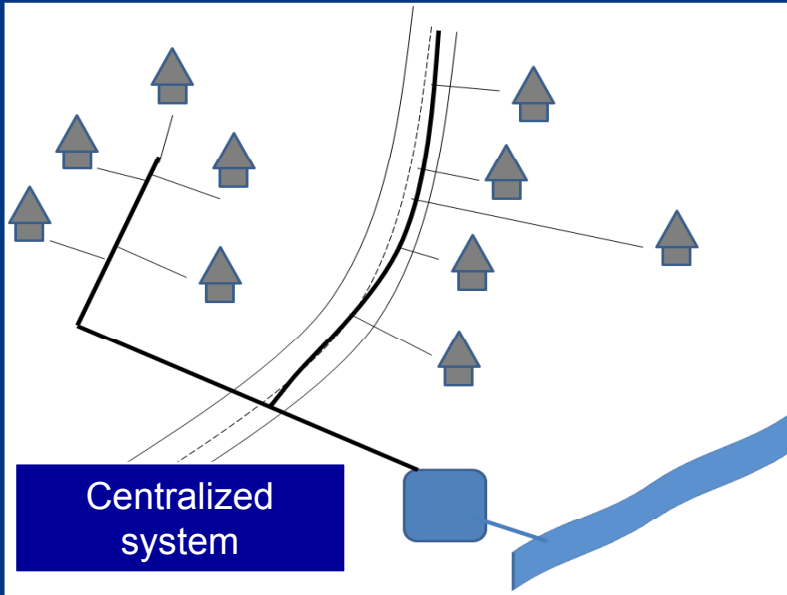
Depends on the site characteristics

- Water availability, quality and demand
- Housing density / space availability
- Potential for re-use of water and nutrients
- Climate and soil conditions
- ...

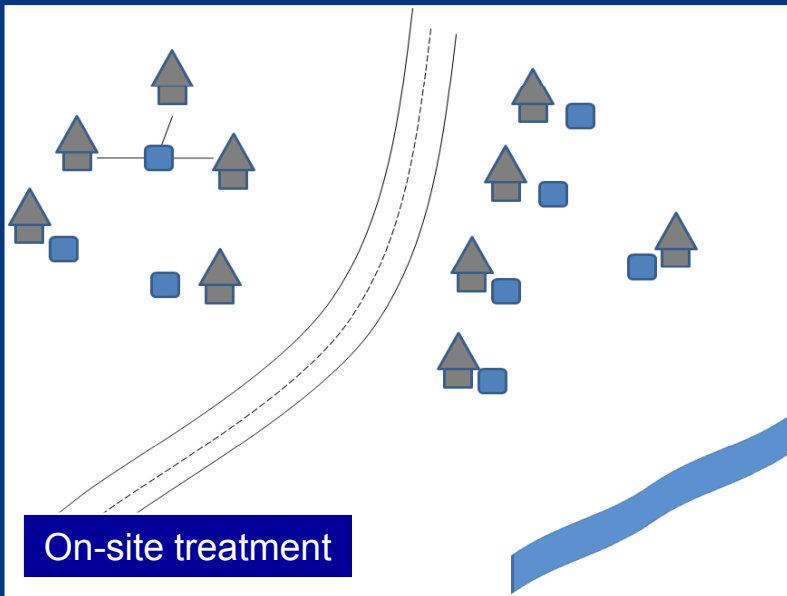
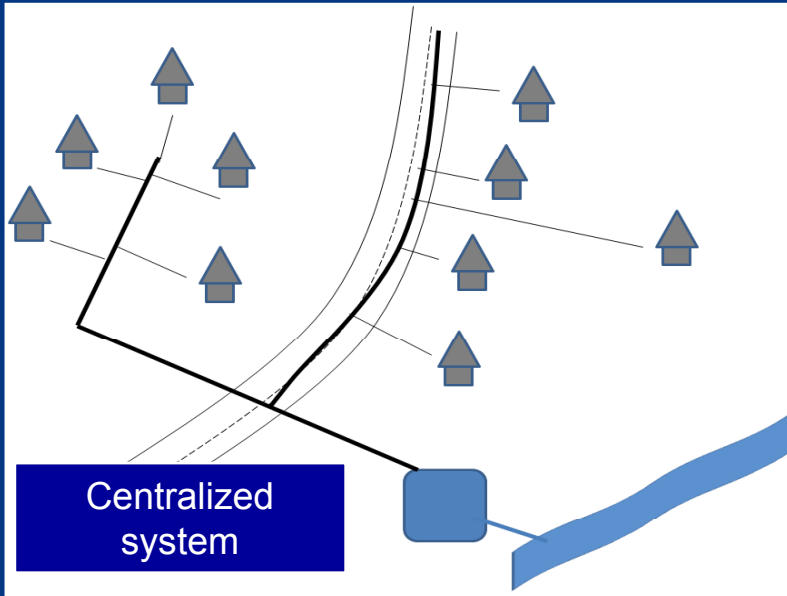
Which wastewater system is the best?



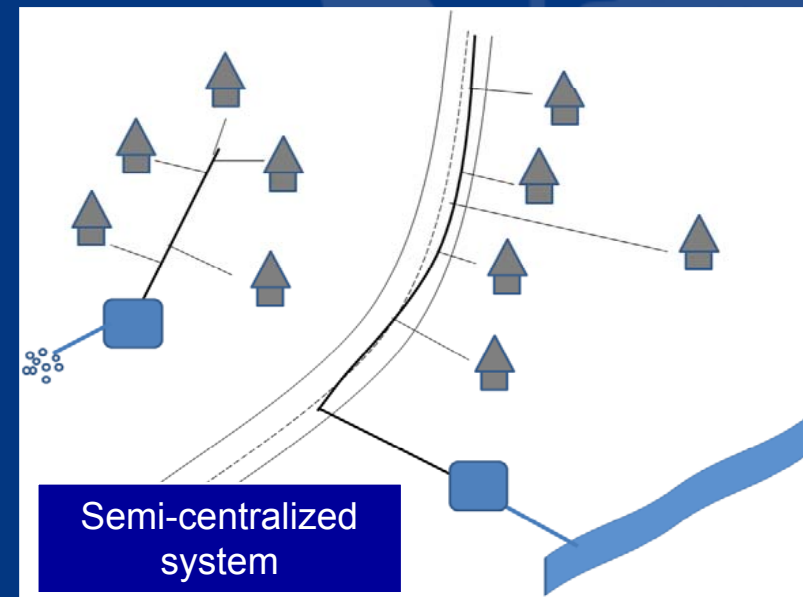
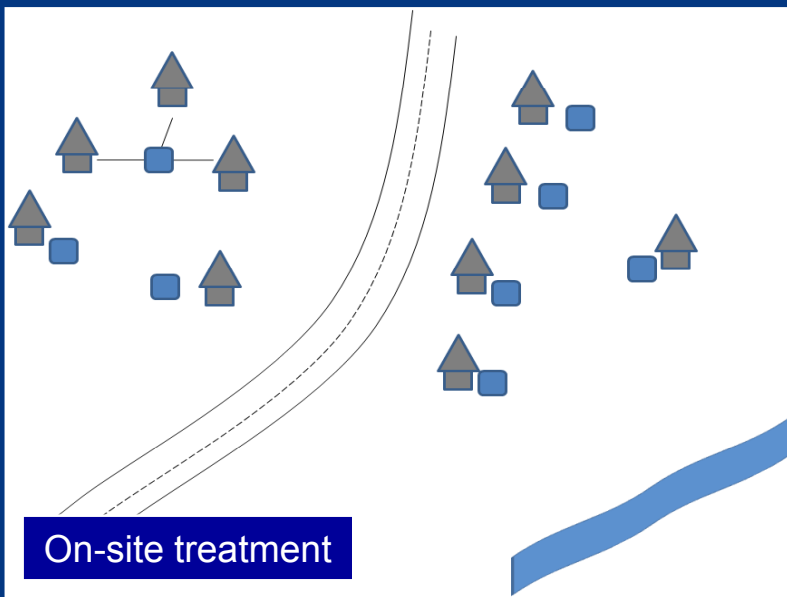
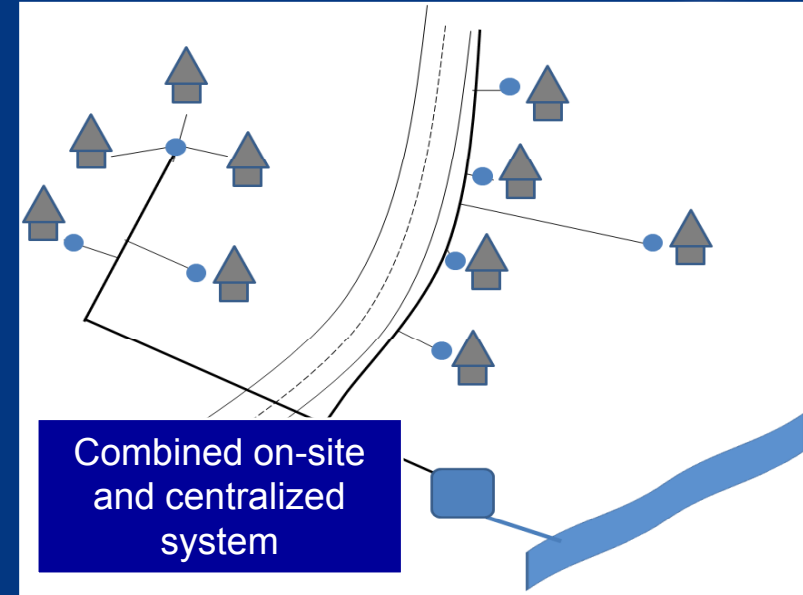
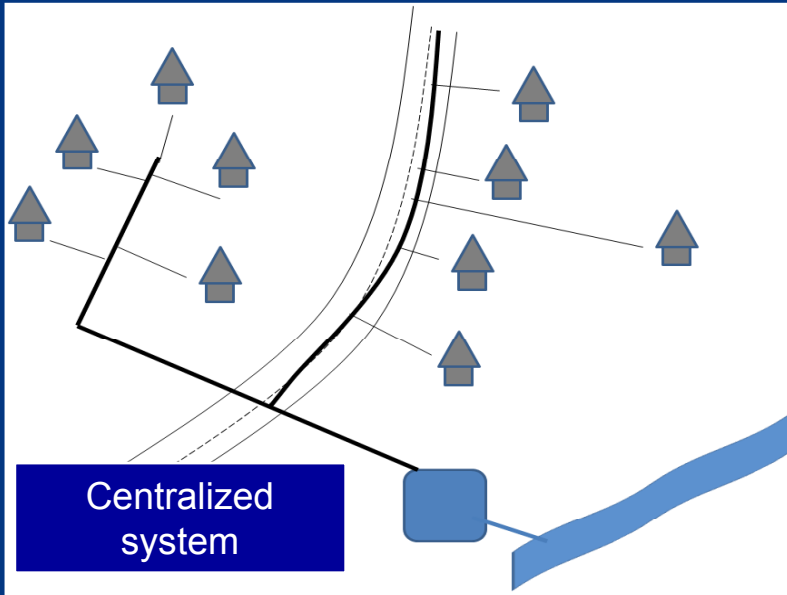
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Which wastewater system is the best?

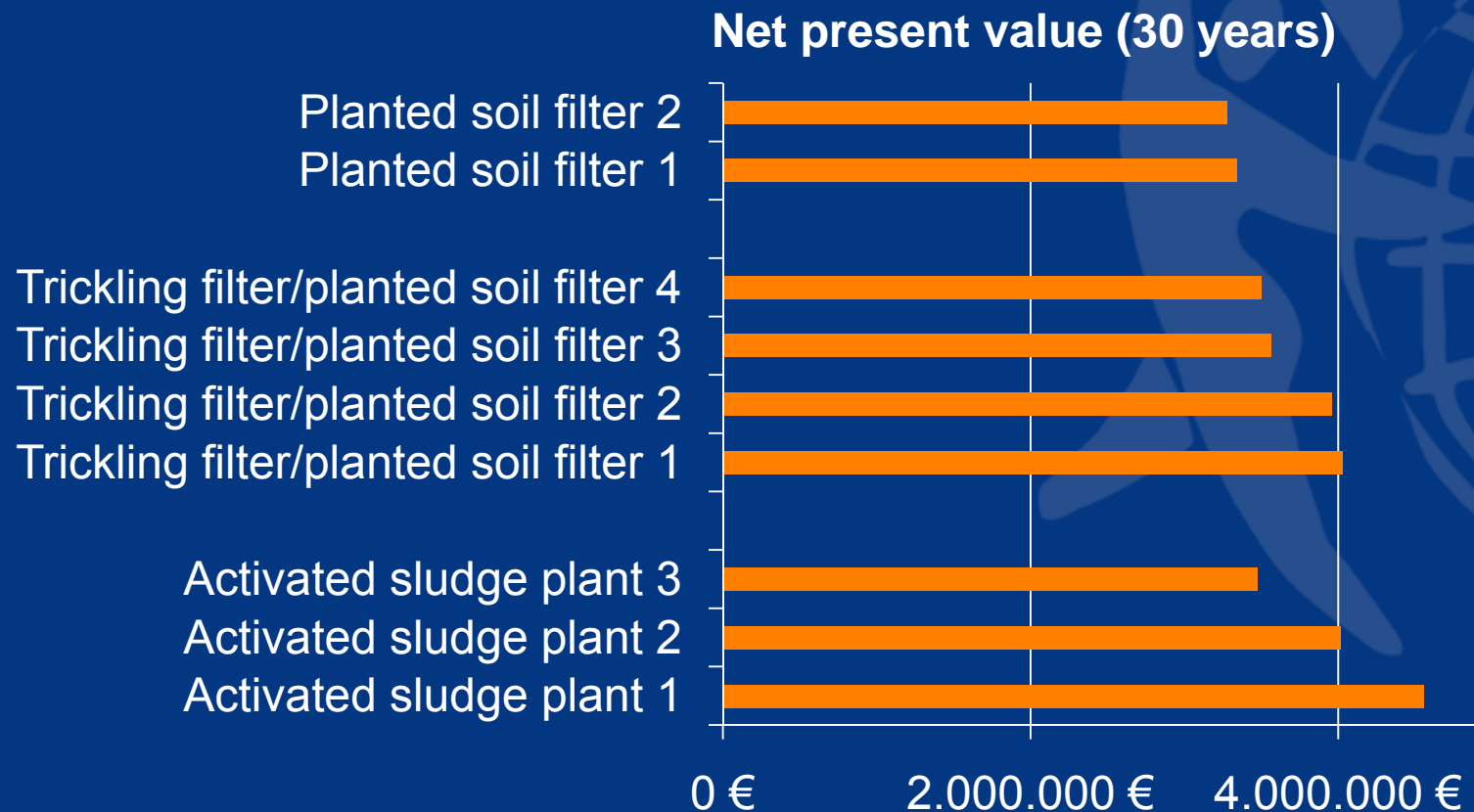


Tool for selection

- Comparison of different concepts/variants (wastewater collection, treatment and re-use)
- Cost comparison of the whole system (investment, operation & maintenance costs over e.g. 50 years)

Comparative cost analysis based on discounted cash flow – Case study 1

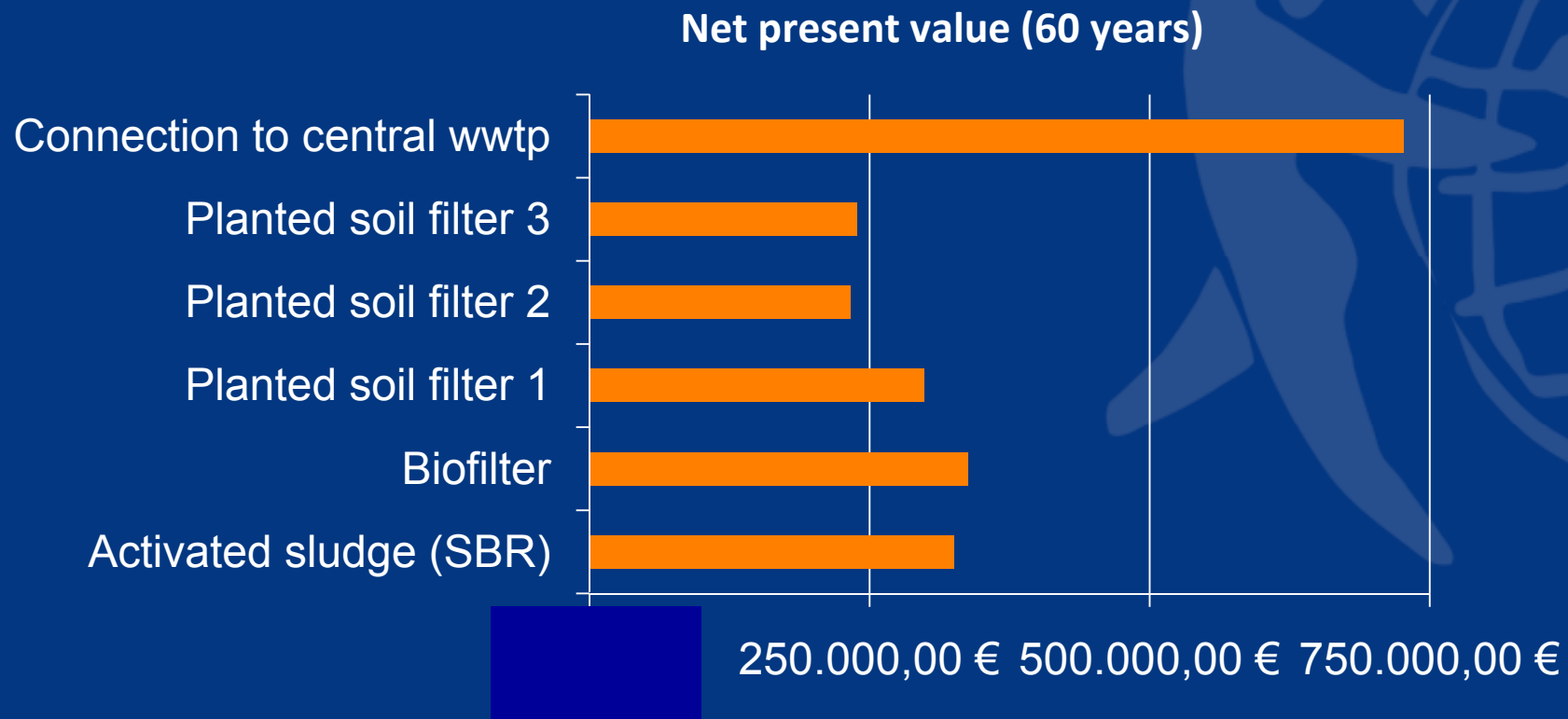
Renovation of an existing wastewater treatment plant for 4,150 PE
(Germany)



Source: Ebeling, B. 2006

Comparative cost analysis based on discounted cash flow – Case study 2

Small wastewater treatment plant (200 PE) versus sewerage connection to the next big treatment plant (Germany)



Source: Ebeling, B. 2009

Barriers of implementing non-conventional wastewater systems

- Considered as low-tech and not modern
- Not accepted by the authorities
- Not known in the population
- Worries about hygienic problems
- Lack of regulation on re-use of water and nutrients (in spite of WHO guidelines)

Financial and economic barriers

Wastewater collection and treatment has not a priority in the national policies and the communities' budgets

No proper cost-benefit analysis is carried out comparing different scenarios for wastewater collection and treatment (decentralised versus centralised, technical versus natural systems)

Recommendations

- Awareness raising to set sanitation higher on the political agenda (multi stakeholder processes, education)
- **Demonstration projects needed**
- Full cost-benefit analysis to compare different scenarios
- National state of the art /regulations/incentives missing

Изкуствени влажни зони

Устойчиво пречистване на отпадъчната вода в малки населени места и полу-градски райони в България

www.wecf.eu



Пример от практиката



Благодаря!

<http://wecf.eu/>

<http://wecf.eu/english/water-sanitation/publications.php>