International Market Survey on Membrane-based products for decentralized water supply

Executive summary

Introduction

With regard to meeting the UN Millennium Development Goals, decentralised water supply has become one of the biggest challenges of the forthcoming years and membrane processes stand as a promising technology to ensure a safe water supply at the community and the household levels. This is particularly relevant for developing countries and rural areas where a centralised water network may be neither economically nor technically viable.

Importance

As the price of membranes has notably decreased over the last years, the market of membrane-based systems for decentralised applications has developed and diversified. Before launching any new R&D programs with respect to this issue, it is interesting to have a view of the current availabilities and possibly identify some future opportunities. Such study was not performed previously. In order to provide a sustainable access to safe water, membrane systems should then be well-adapted to local conditions, that is to say, low-cost, easy-to-maintain, robust and as far as possible independent of chemicals and energy supply.

Approach

The identification of the membrane-based products was performed through literature and Internet researches and form requests during a 4 month-period. 204 water companies were indeed contacted and asked to characterise their Point-of-use (POU) or small-scale membrane systems, with a focus set on operation and maintenance, costs and energy requirements. With a 15% reply rate, the survey enables to identify the different market niches. That includes ceramic POU, organic POU, organic point-of-entries (POE), modular treatment units and emergency systems, whose technical characterization is further detailed in the Annex of the report.

Result

The membrane market for water supply and sanitation is large and many products are commercially available. Yet, when looking more specifically at small units for drinking water uses, the market is still at a growing phase, and most of developments occurred in the past 3-5 years. This study can not be regarded as an exhaustive survey but a good basis for development considerations. However, at this stage, it was difficult to integrate consistent considerations on costs and energy requirements, although they are relevant parameters.

Besides, the review of the marketed membrane modules reveals that ultrafiltration is the most available process. The survey also shows that the pre-treatment is a key parameter when considering options for decentralised water supply. As needs for sustainable solutions for small water supply are established, the membrane market is expected to grow and more standardised products to appear. Depending on the product niche, the membrane material and the filtration type (MF / UF / NF / RO), different degrees toward the market maturity are then identified and presented in Figure 1.

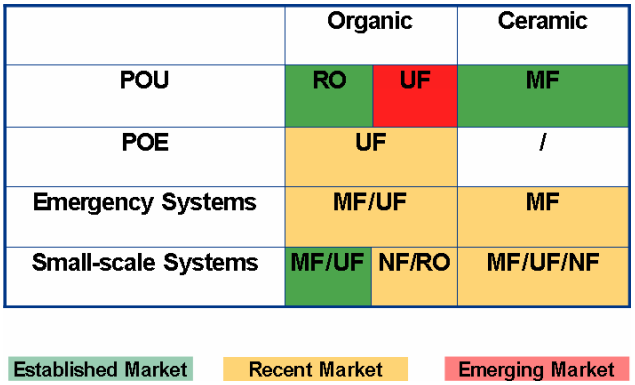

Figure 1 - Market Overview for membrane-based systems regarding small water supply

More information

This survey and its results have been described in the report D.2.5.3: *International Market Survey for Membrane-based Products for Decentralised Water Suppy* by E.Hoa & B.Lesjean.

Contact person: Eric Hoa, KompetenzZentrum Wasser Berlin (KWB) gGmbH
+49 (0)30 536 53 808, eric.hoa@kompetenz-wasser.de

TKI Categorisation

Classification									
Supply Chain		**Process Chain**		**Process Chain (cont'd)**		**Water Quality**		**Water Quantity (cont'd)**	
Source		**Raw water storage**		**Sludge treatment**		**Legislation/regulation**		- Leakage	
- Catchment		- Supply reservoir		- Settlement		- Raw water (source)		- Recycle	
- Groundwater		- Bankside storage		- Thickening		- Treated water			
- Surface water	X	**Pretreatment**		- Dewatering		**Chemical**			
- Spring water		- Screening		- Disposal		- Organic compounds			
- Storm water		- Microstraining		**Chemical dosing**		- Inorganic compounds			
- Brackish / seawater		**Primary treatment**		- pH adjustment		- Disinfection by-products			
- Wastewater		- Sedimentation		- Coagulant		- Corrosion			
Raw water storage		- Rapid filtration		- Polyelectrolyte		- Scaling			
- Supply reservoir		- Slow sand filtration		- Disinfectant		- Chlorine decay			
- Bankside storage		- Bank filtration		- Lead / plumbosolvency		**Microbiological**			
Water treatment		- Dune infiltration		**Control/instrumentation**		- Viruses		**Consumers / Risk**	
- Pretreatment		**Secondary treatment**		- Flow		- Parasites			
- Primary treatment		- Coagulation / flocculation		- Pressure		- Bacteria		**Trust**	
- Secondary treatment		- Sedimentation		- pH		- Fungi		- In water safety / quality	
- Sludge treatment		- Filtration		- Chlorine		**Aesthetic**		- In security of supply	
Treated water storage		- Dissolved air flotation(DAF)		- Dosing		- Hardness / alkalinity		- In suppliers	
- Service reservoir		- Ion exchange		- Telemetry		- pH		- In regulations and regulators	
Distribution		- Membrane treatment		**Analysis**		- Turbidity		**Willingness-to-pay/acceptance**	
- Pumps		- Adsorption		- Chemical		- Colour		- For safety	
- Supply pipe / main		- Disinfection		- Microbiological		- Taste		- For improved taste / odour	
Tap (Customer)		- Dechlorination		- Physical		- Odour		- For infrastructure	
- Supply (service) pipe	X	**Treated water storage**						- For security of supply	

- Internal plumbing		- Service reservoir				**Water Quantity**		**Risk Communication**	
- Internal storage		**Distribution**						- Communication strategies	
		- Disinfection				**Source**		- Potential pitfalls	
		- Lead / plumbosolvency				- Source management		- Proven techniques	
		- Manganese control				- Alternative source(s)			
		- Biofilm control				**Management**			
		Tap (Customer)				- Water balance			
		- Point-of-entry (POE)	X			- Demand / supply trend(s)			
		- Point-of-use (POU)	X			- Demand reduction			

TKI Categorisation (continued)

Contains		**Constraints**		**Meta data**					
Report	X	Low cost	X	*Author(s)*	Eric Hoa, Boris Lesjean				
Database	X	Simple technology	X	*Organisation(s)*	KWB				
Spreadsheet		No / low skill requirement	X	*Contact name*	Eric Hoa				
Model		No / low energy requirement	X	*Contact email*	Eric.hoa@kompetenz-wasser.de				
Research		No / low chemical requirement	X	*Quality controller name*	Wouter Pronk				
Literature review		No / low sludge production	X	*Quality controller organisation*	EAWAG				
Trend analysis		Rural location	X	Source					
Case study / demonstration		Developing world location	X	*Date prepared*	March 2008				
Financial / organisational				Date submitted (TKI)					
Methodology				Date revised (TKI)					
Legislation / regulation									
Benchmarking									