Executive Summary
Membrane Technologies Report

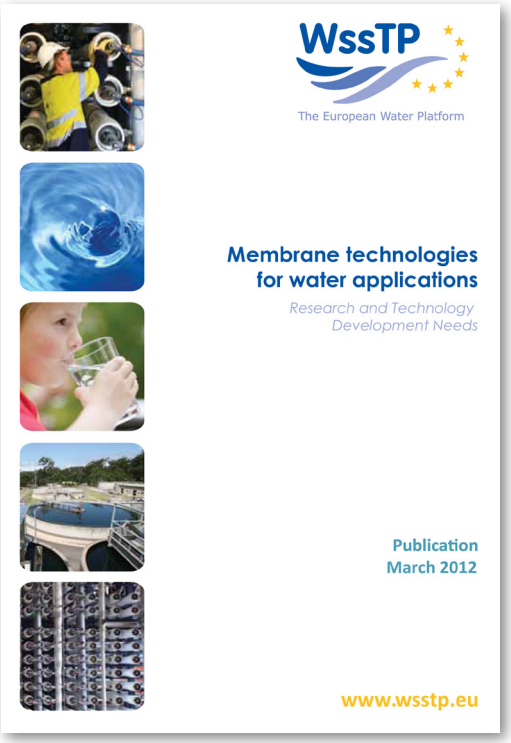
WssTP
The European Water Platform

EMH

THE BACKGROUND OF THE MEMBRANE TECHNOLOGIES REPORT

This report was published in March 2012 and was elaborated in collaboration with The European Membrane House.

The faulty notion that water is free and available in unlimited quantities has led to poor water conservation and inefficient use. Only 1% of the world's water is available as freshwater, 97% is oceanic salt water and a further 2% is frozen at poles. As a consequence sea water and brackish desalting, municipal wastewater treatment, industrial effluent processing, drinking water production have become crucial problems for the future of our societies which are strongly demanding new solutions.



Membranes are key technologies for the future of in all these applications in so far as they are very competitive with others, and generally, older technologies, for liquid and particularly water and waste water treatment. Traditional membrane technologies -RO, UF, NF, EDR – but also more recent concepts –MBR, membrane contactors -participate in the strong effort which is being developed at the world level.

MAIN FINDINGS AND FUTURE RESEARCH NEEDS

Historically, membrane separation processes have been developed for the industrial manufacturing of high value products such as energy production (nuclear power, cooling towers etc), or for the pharmaceutical/ medicine and food/beverage industries. In contrary to these high value products, water is a good that needs to be produced for large volumes and at low cost (typically 1€/m3), requiring huge amounts of membrane surface with as low as possible specific production costs. The business model of successful membrane technologies for water applications include therefore the production of large quantities of membrane and modules, reducing the production costs through economy of scale, and scaling-up and integrating the modules in large systems.

In this sense, three priority R&D needs has been identified by the Membrane Technologies Working Group:

- Next process generation of hybrid membrane systems for water treatment increasing synergy between membrane systems and biology, oxidation, adsorption, coating
- Next process generation for low energy seawater desalination: processes with technological breakthrough
- Environmentally friendly designs in membrane processes

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A Common Vision for Water Research and Innovation

Strategically, they result from the observation that Europe has today no world leader of membrane systems for water applications (the European leaders Norit and Inge come only in the 4th and 11th positions, with a relatively low market share). As the technologies currently implemented (MF, UF, NF, RO, MBR) have been developed and optimized over several decades, the chance of a technological breakthrough that will result in a new leading technology is very low. The vision is therefore to support today the establishment of European leaders with tomorrow's technologies (forward osmosis, membrane distillation, hybrid systems, biomimicking membranes etc)

CONCLUSIONS

The global market of membrane technologies for water applications amounts to at least $ 11 billion per year with a steady annual growth greater than 10% over the last decade. Membrane technologies are one of the promising solutions for water management in industrial countries, and represent a real technical and commercial opportunity for the coming years.

There is a strong expertise in Europe on membrane processes, however this knowledge is very fragmented. Despite much recent R&D effort in recent years there is still no world leader from Europe in membrane system manufacturing for water applications. In order to increase European leadership and market share, with the vision of European "membrane champions", the strategy is not to compete against established technologies, but rather to seek for technological breakthroughs that will lead to the next generation of membrane technologies for water applications. In particular, the energy demand of membrane processes is likely to become the critical issue which will ensure long term market growth of membrane technologies applied to water resource management.

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This report was published in March 2012 and involved 8 contributors from different countries and was created in collaboration with the EMH

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