Brackish water off-grid desalination systems for developing countries

N. Tiggelman1, E. Toet1, E. van der Burg1, H-J. Rapp2, D. Gutzeit3, M. Vanoppen4, L. Gutierrez1, A. Verliefde4, L. Gurreri5, A. Campione5, A. Cipollina6

1FUJIFILM Manufacturing Europe B.V, The Netherlands
2Deukum GmbH, Germany
3Phaesun GmbH, Germany
4Ghent University, Belgium
5University of Palermo, Italy

The REvivED water project aims to contribute to overcoming the drinking water challenge through desalination technology. The goal is to produce safe and affordable drinking water with a significantly reduced energy consumption compared to the current state-of-the-art technology. The overall project comprises several systems and applications with twelve pilots in total, ranging from Electrolysis (ED) small systems for brackish water desalination to larger scale hybrid (RED/ED-RO) systems for sea water desalination.

Specific attention is devoted to develop energy efficient and robust brackish water desalination systems for application in developing countries.

To reduce the energy consumption of the desalination process, several design parameters have been optimized, e.g., membranes and spacers characteristics, stack configurations, flow path length. To assure the system robustness, several concepts have been investigated, including pre-treatment options, capacitive electrodes, one pass flow as well as gravity driven flow. Intensive modelling and experimental validation are being carried out for the process and system design.

The first brackish water desalination results demonstrate that up to a conductivity of ~4.000 µS/cm the project energy consumption target of 0.4 kWh/m³ can be achieved.

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Impact of module size on solar powered membrane filtration (UF-NF/RO)

Andrea I. Schäfer1,2,* Azam Jeihanipour1, Junjie Shen2,3, Bryce S. Richards2,3,4

1Membrane Technology Department, Institute of Functional Interfaces (IFG), Karlsruhe Institute of Technology, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany
2Tel. +49 721 6082 6906; email: Andrea.Iris.Schaefer@kit.edu
3Nelson Mandela African Institute of Science and Technology (NMAIST), Arusha, Tanzania
4School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh EH14 4AS, UK
5Institute of Microstructure Technology (IMT), KIT, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

Integration of solar photovoltaic (PV) systems and membrane filtration technologies, namely nanofiltration (NF) and reverse osmosis (RO), has been suggested as a sustainable solution to provide drinking water to the remote locations where natural freshwater resources are scarce.