



Assessment of processes to increase the lifetime and potential reuse and recycling of reverse osmosis membranes towards a circular economy. Case of study of Cape Verde and Macaronesia area

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ABSTRACT

Reverse osmosis membranes could be reused in the same or another desalination plant, the useful life of these membranes could be extended reusing them by oxidation of reverse osmosis elements to obtain nanofiltration, ultrafiltration or microfiltration membranes. Recycling is also an opportunity for the obsoleted reverse osmosis membranes. The main categories of recycling by thermal processing commonly used in the industry include incineration and pyrolysis to produce energy, gas and fuel. These processes can be applied to mixed plastic waste, such as the combination of materials used in the manufacture of reverse osmosis membranes. Recycling of reverse osmosis elements from desalination plants is shown to be an opportunity and pioneering initiatives are already underway in Europe. Energy recovery, via incineration, is feasible but is not considered in line with the environmental, social, and political problems it may generate. However, the recycling of reverse osmosis elements via the pyrolytic industry for fuel production can be centralized in a new industry already planned in Macaronesia area and all obsolete osmosis membranes can be sent there. This is a technically and economically viable business opportunity with a promising future in today's recycling market as discussed in the article.

Keywords: Reverse osmosis; Membranes; Desalination; Reuse and recycling

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