



Retrofitting assessment of a full-scale brackish water reverse osmosis desalination plant with a feed capacity of 600 m³/d

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ABSTRACT

Reverse osmosis (RO) is the most widespread technology in the desalination of seawater (SW) and brackish water (BW). In BW desalination, the use of energy recovery systems is not as evident as in the desalination of SW, due to the other factors such as higher flux recoveries and lower specific energy consumptions. This paper studied the economic feasibility of installing interstage pump and RO membrane replacement by nanofiltration in a BWRO desalination plant with a feed capacity of 600 m³/d. Experimental data over the course of more than 2 y of nonstop operation were collected. The BWRO desalination plant had microfiltration and antiscalant dosing as pretreatment and RO system with two stages, 3 pressure vessels (PV) in the first stage and 2 in the second stage with 6 RO membrane elements for each PV. The production of the plant is for agricultural irrigation. A study was made considering different scenarios regarding the plant's efficiency, permeate quality, and economic viability.

Keywords: Brackish water; Reverse osmosis; Long term; Nanofiltration; Hybrid system; Irrigation

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