

## WATER SECURITY AND REVERSE OSMOSIS (RO) DESALINATION OPPORTUNITY

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### **Abstract:**

Natural water cycle, moving 500,000 km<sup>3</sup> by year, plays a central role to ensuring the life on the planet. Nevertheless, growing anthropic runoff alteration (40,000 km<sup>3</sup>/year) make more and more vulnerable water availability imposing the general issue of water security.

The concept of water security has received increasing attention over the past decade, in both policy and academic studies and researches. Sea and brackish water desalination is one of the option often suggested to mitigate this problem.

In 2012, it was estimated an annual world production of more than 70,000,000 m<sup>3</sup>/d obtained in 16,000 plants, of which less than 65% based on membrane processes mostly Reverse Osmosis (RO) and the other quota based on thermal processes mainly Multi-stage flash (MSF) (27%). Desalination technologies are the most energy-intensive water production systems available today absorbing 0.4% of global electrical power consumption but they will play an increasing role in bridging the water gap in many countries.

The objective of this paper is to investigate on the RO process role in terms of energy and production efficiency to be a valid tool in an integrated water resources management moving towards water security. In the first section will be explained what is RO process and how it does work with the aim to highlight its weaknesses and strengths. In section two, key cost and environmental data will be analyzed and discussed. The last section a case study will present concerning the role of RO process in Apulia region water resource management.

*Keywords: water security, integrated water resources management, reverse osmosis desalination, desalination costs, water costs*