

Review

Desalination and sustainability – An appraisal and current perspective

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Highlights

- Sustainability of desalination was appraised and a current perspective was elaborated.
- A comparison with other water supply and wastewater treatment alternatives presented.
- Recent developments around the world in desalination applications were discussed.
- Driving factors for desalination market and sensitive, futuristic issues discussed.
- Socio-economic, energy and environmental components of desalination were discussed.

Abstract

Desalination technologies have evolved and advanced rapidly along with increasing water demands around the world since 1950s. Many reviews have focused on the techno-economic and environmental and ecological issues of the desalination technologies and emphasized the feasibility of desalination industry as an alternative to meet the water demands in many water scarce regions. Despite these efforts, many perceptions about desalination processes hinder their applications for potential water supplies. This article has two specific aims: 1) provide an overview of the desalination trends around the world and discuss the sustainability components of desalination processes in comparison with other water supply alternatives; and 2) discuss case studies for desalination, and drivers and factors that influence sustainable desalination and other alternative water sources for desalination to increase our current understanding on the sensitive and futuristic issues of water supply and resource management options for drought facing regions. Although some of the facts and recent developments discussed here show that desalination can be affordable and potentially sustainable, contributions that meaningfully address socio-economic and ecological and environmental issues of desalination processes are urgently required in this critical era of severe water stress for the present context and the future development of desalination technologies.

Graphical abstract