



## Desalination and Natural Hazards

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With pressures such as climate change and population growth, cities and especially larger cities have become more water stressed. Thus the growing demand for drinkable water due to water scarcity in different World regions and its reliable supply, have persuaded humans to construct desalination plants. Today, the implementation of different large-scale desalination methods is increasing. Desalination is a separation process that consists on the removal of salts from water (seawater or brackish water) to make it suitable for other purposes.

The most important environmental aspects for a desalination plant are the location of the plant, brine disposal and energy considerations. However this issues can be sometimes affected by a natural adversity. Conventional desalination processes used are normally classified in thermal and membrane. The energy required by these processes could be of any form of heat, electrical or mechanical depending on the separation process. These types of energy derive from fossil fuels, which conditions the desalination sustainability –environmental and economical. To improve this reality, the desalination industry is making a great research effort related to novel technologies, the use of renewable energies, and brine management. Presently desalination membrane technologies are preferred over thermal ones (based on evaporation) since they allow for continuous operations close to ambient temperatures. Moreover, the offer for a wider selection of large equipment and modules is increasing. This makes it possible to design processes according to potable needs as well as ease the use of membranes and other separation technologies together.

Traditionally the location of the plant is an obvious matter where selection of site should be determined by considerations of mainly energy supply available and distance in relation to feed water intake, disposal site and end-user. This means locating these plants in coastal areas or inland locations and look for a solution to then naturally dispose their brine waste. However, a desalination plant can be affected by different natural hazards depending on where they are located and therefore they should be considered when determining the optimum site for it.

A natural hazard is an unexpected or uncontrollable natural event of unusual intensity that threatens people's lives or their activities. Atmospheric hazards are weather-related events, whereas geologic hazards happen on or within the Earth's surface. However, it is important to understand that the capricious force of nature can trigger catastrophes that could impact households, communities and even threaten life across the world depending on the desalination plant location.

Little work has been undertaken so far to explore the impact of desalination in the presence of a natural event. Hence, this paper studies the role of desalination and desalination plants when a natural hazard occurs because they can either be a mitigation source for water scarcity or can be turned into a greater disaster. A couple of examples will also be shown.

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