The Global Desalination Market to 2026

Commercial, Technical & Strategic developments in the Global Desalination Market across the next decade

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1.1 Executive Summary

Ninety-seven percent of the globe's water is contained in seas and oceans; of the remaining 3% only 0.01% of the globes water flows through rivers and accumulates in lakes. Increased demand for drinking water globally has positioned the desalination sector at the forefront of the utility sector.

Water scarcity is a problem to some degree in every continent. This water scarcity leaves some countries little alternative than to build desalinisation plants to remove salt from sea water or other salinized / brackish water.

In water stressed regions public municipalities have historically provided any desalinated water, but as the scarcity of water is increasing, the private sector is becoming increasingly involved in this market to provide wholly privately owned and operated desalination plants. Desalination has had a long history for small scale water production, but more recently it has become widely accepted as a large utility scale water solution provider.

Key global economies such as the US, China, Spain, Saudi Arabia are proponents of the desalination sector, alongside emerging / growth markets such as Mexico, Israel, Kuwait, UAE and Qatar.

The global desalination sector reached $7,865m across 2011, GMR Data forecast that this figure will reach $12,603m across 2016; equating to a 5-year CAGR of 9.9%, this growth has been primarily driven by the Middle East, North America and Asia Pacific where a number of high profile, large scale desalination projects have been realised.

Between 2016 and 2021, GMR Data forecast that the 5 year CAGR growth, in the desalination sector, will fall below 5% for the first time in 20 years as some ME countries, that are key proponents of desalination projects, face uncertain financial landscapes, particularly in relation to the expected fluctuation of oil prices across the next 5-10 years.

Between 2021 and 2026 many global regions will move away from brand new projects, instead focusing on new technology on existing sites. Many countries will have spent money on long term projects; Saudi Arabia, Israel, Australia and the US, for example, and are likely to upgrade existing plants as opposed to starting new projects. Regions such as Europe and North Africa are likely to offer very little growth in the global desalination sector by 2026.

3.3 Filtration Research and Development

3.3.1 Membrane Improvements

The second largest O&M cost is for cartridge filters and RO membrane replacements. The primary issue that warrants RO membrane replacements is fouling of the membrane surface.

Surface fouling (or Biofouling) can occur from a variety of contaminants, including suspended particulate matter, dissolved organic matter, dissolved solids, and biogenic material.

Without sufficient pre-treatment fouling is more likely to occur, this can significantly decline the filtration efficiency of RO, FO and other non-thermal desalination plants. As a result the membranes need to be replaced or chemically treated more frequently.

As more desalination plants are constructed with RO membranes in situ, more money is being spent on the R&D of membrane technology;

- Manufacturers are including more membrane area per membrane element which allows operating pressures to be steadily reduced. Both factors are continuing to reduce membrane replacement costs and associated energy requirements.

- Some membrane technologies have a higher salt rejection rate than other which allow fewer passes through the membrane, which allow a longer product life.

Incremental steps in membrane technology are helping to bring the lifetime cost down of RO and are making Reverse Osmosis a more attractive option than the more expensive, energy intensive, options of MSF. Both sea and brackish water need intensive pre-treatment before it can pass through the desalination process. The performance of a RO system depends on the quality of the pre-filtration.

When intake water has been subjected to a finer filtration system (nano, ultra, micro) when it arrives at the RO juncture, significantly less pressure is needed to move the water as it contains far fewer impurities. This can significantly reduce the amount of energy that is needed to pump the water.

3.3.2 Microfiltration

Microfiltration is ideal as RO pre-treatment because it produces filtrate of a consistent quality irrespective of variations in the feed in water. A microfilter removes particles as the feed water flows through the microfilter membrane. Microfilters remove particles down to 0.1 micron in size – 10 to 100 times finer than media filters. Microfiltration is a purely physical process in which particles are captured on the surface on the membrane. Any particle larger than the pore size of the membrane cannot squeeze through, for example;

4.2.2.2 New Desalination Capacity China

The Chinese State Council makes it clear that they want to prioritise their domestic seawater desalination industry in the country with a long stated aim of producing 2.6m m^3/day by 2016. In support of this aim work has started on the **Bohai Bay** near the city of Tangshan to build a desalination plant to help to meet freshwater demands in Beijing. When operational in 2019, the Bohai Bay plant will have supply a daily capacity 50,000 m^3/day of desalinated water.

Key Chinese State Council plans to boost the country's desalination capacity include;

- strengthen the R&D of key technology and equipment
- raise the engineering and technological capabilities
- establish multiple desalination bases
- form up an industrial desalination alliance
- stage seawater desalination demonstration projects
- build seawater desalination demonstration cities
- promote the use of desalinated water
- perfect a desalination standard system

Table XX Cangzhou / Bohai Bay Desalination Project

Location	Company	Contract Announced	Size m^3/Day	Desalination Format	Contract	Cost
Cangzhou / Bohai Bay	Aqualyng / Beijing Enterprises Water Group	2013	XX	SWRO	BOOT	$XXbn

GMR Data 2016

The **Cangzhou** seawater desalination plant will be built in the New Bohai Development Zone (BNAIZ) located in the eastern part of Hebei Province. The BNAIZ is a state-level supported economic development zone, established in 2007. It includes the Huanghua Port, the Zhongjie Industrial and Chemical Industries Park, and the Nandagang Industrial Park.

The Cangzhou plant will use seawater from the Bohai Bay as the raw water source and is designed to supply the Development Zone with up to 50,000 m^3/day of desalinated water (phase I) with an additional 50,000 m^3/day in phase II (not included in the proposed contract of guarantee). The desalinated water will be sold to end users within the BNAIZ to be used for industrial purposes.