

INLAND FACILITY	Finance
Post-treatment	Post-treatment Processes and Distribution

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KEY POINT: *Post treatment costs are primarily driven by target product water quality and final use of the desalinated water.*

SUMMARY OF ISSUES

- ▶ Post treatment capital costs incorporate the costs for construction of:
 - Chemical condition system for permeate stabilization
 - Disinfection system
 - Facilities for product water quality polishing
- ▶ Post treatment costs are primarily driven by target product water quality and the final use of the desalinated water. Typically, the higher the required product water quality, the higher the desalinated water costs.
- ▶ Compared to potable and agricultural uses, desalinated water quality requirements for TDS, boron, chlorides, sodium, silica and other contaminants may be even more stringent for some industrial applications, especially those in which ultra-pure water quality is necessary. This can further increase post-treatment costs.
- ▶ Typically, the costs for construction of post-treatment facilities for permeate stabilization and disinfection fall within a range of between \$20 and \$50/m³/d (\$0.08 – 0.20/gpd) (Voutchkov 2007). This estimate is for SWRO plants, but for BWRO plants with similar product water quality, these estimates can be applied. If the permeate has to be polished to achieve removal of specific constituents, than post treatment costs may increase beyond this range.
- ▶ Miller (2003) provides a breakdown of the various costs associated with BWRO desal. He reports that consumables, which include the various chemicals used in both the pretreatment and post-treatment processes, account for 10% of the total costs associated with building and operating a BWRO facility. He does not report what percentage of total capital costs can be attributed to post-treatment facility needs.
- ▶ Table 1 shows an approximate breakdown of the fixed costs for an RO plant as outlined by Pittner (1993) (reported by Miller 2003). Pittner reports that the RO membrane and associated components can be purchased for about \$1 per gallon/day capacity (or about \$1.50 per gallon/day in 2009 \$US). Costs associated with additional process components (pretreatment and polishing) amount to about 60 – 80% of the RO Unit.

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Table 1. Fixed costs for an RO desal plant

RO component	Relative cost
RO Unit	\$1/gal/day
Pretreatment	30% of RO Unit
Polishing	30 – 50% of RO Unit
Installation cost	30% of total equipment cost (including RO unit, pretreatment and polishing)
Site	150% of total equipment cost

Source: Adapted from Miller (2003)

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KEY UNCERTAINTIES

Costs associated with post-treatment are very site-specific. They not only with target product water quality, but also with the source water quality (which can be influenced by unforeseen events such as red tides or contaminant spills). Costs are also affected by the technology or combination of technologies selected to meet the product water quality requirements, and the costs of various consumables (i.e. chemicals, power, ion-exchange material, etc.) used for product water quality polishing.

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ADDITIONAL RESOURCES

Miller, J.E. 2003. *Review of Water Resources and Desalination Technologies*. Available: Sandia National Laboratories, Albuquerque, NM.

Pittner, G.A. 1993. in *Reverse Osmosis*, Z. Amjad, ed. Chapman Hall, New York.

Voutchkov, N. 2007. Budgeting and Implementation of Desalination Projects. In *The Guidebook to Membrane Desalination Technology*. Edited by Wilf, M. L' Aquila, Italy: Balaban Desalination Publications.

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