INLAND FACILITY	Energy & Greenhouse Gas Issues
Post-treatment	Post-treatment Processes and Distribution

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KEY POINT: *Energy use associated with post-treatment varies based on the types of post-treatment required for stabilization of product water.*

SUMMARY OF ISSUES

- Desalinated product water (from both inland and desal facilities) almost always requires some type of post-treatment. Post-treatment is necessary in order to stabilize the product water prior to storage and distribution.
- Energy consumption associated with post-treatment varies based on the type of treatment required to stabilize the product water.
- Blending is the simplest and least energy intensive post-treatment alternative for product water stabilization. For the common degasification treatment to partially remove CO_2 and completely remove H_2S from some brackish groundwater, operating power depends on the type of stripping system$_s$ used and the energy eff$_i$ciency of the blowers and pumps. Detailed calculation on total power requirements can be determined using equations in Water Treatment Principles and Design (MWH 2005).
- For brackish water desal, presence of H_2S may complicate permeate stabilization. Complete removal of H_2S will result in parallel removal of CO_2. If residual CO_2 after the degasification is too low to produce sufficient alkalinity, bicarbonate has to be added to permeate.
- Depending on local regulations and water quality requirements, disinfection can be conducted by chlorination, formation of chloramines, chlorine dioxide, and UV radiation. UV radiation requires more energy than chlorination in the forms of chlorine gas, liquid or hypochlorite solution.
- Post-treatment energy use constitutes a small portion of the overall energy use in a desal facility. In general, the energy consumption of various post-treatment options follows the order of degassing > chemical addition and stabilization (e.g., chlorination, pH adjustment, SAR adjustment, etc) > blending.

STRATEGIES

The choice of post-treatment processes, and associated energy consumption, is project specific and depends on the particular chemistry of the desalinated water, the existing infrastructure, ease of operation, and the availability, quality and cost of locally available chemicals.

Many brackish water desal plants blend desalted water with raw water or pretreated water to minimize the post-treatment requirement. When possible, blending is the most energy efficient and economical option to reduce the side impacts of desalted water and meet product water requirement.

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KEY UNCERTAINTIES

In addition to stabilization, other post-treatment objectives may include water quality polishing by removal of specific compounds such as boron and disinfectant by-products (DBPs). This will increase energy consumption of post-treatment.

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ADDITIONAL RESOURCES

MWH. 2005. *Water Treatment: Principles and Design. 2nd Edition.* John Wiley & Sons, Inc.

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