

quick facts on ...

Splash! Seawater Desalination in South Florida

Alternative Source of Potable Water for South Florida

Background

Compared to using groundwater from the Floridan or Biscayne Aquifer systems as a source of potable water, very little seawater sources have been used in South Florida Water Management District's (SFWMD) jurisdiction of sixteen counties. Eight of these counties have coastal boundaries and access to limitless sea water. The reason is mostly because the cost of seawater desalination (desal) is still significantly higher than traditional treatment of less saline groundwater. However, seawater desal costs are declining due to improvements in membrane technologies and energy recovery research.

World's largest seawater desal plant

The Ashkelon seawater plant in Israel producing 70 million gallons per day (MGD), is the largest in the world. It started production in August 2005. There are 17,350 desalination units worldwide with a total installed or contracted capacity of 10 billion gallons per day. Desalination is used in 125 countries around the world. The US has 800 plants with a capacity of about 225 MGD.

In 2002, the SFWMD and Florida Power and Light Company (FPL) examined 23 coastal sites in the District and recommended two potential sites as highly desirable co-location facilities. Motivated by the 2002 study, negotiations started between FPL and Lee County Utilities, facilitated by SFWMD, to implement the desal option to be co-located at FPL's plant in Fort Myers. However, the talks were temporarily suspended in early 2004 until crucial issues of timing, funding, benefit-sharing due to co-location, site-specific data, and real estate matters are clarified.

Seawater desalination

Seawater and salty waters of inland seas, highly mineralized groundwaters, and municipal wastewaters contain dissolved substances. Desalination makes water fit for human consumption, irrigation, industrial use and other purposes. Distillation is the most widely used desalination process; use of electrodialysis and reverse osmosis is also increasing.

Reverse Osmosis (RO) purifies saltwater by forcing it through semi-permeable membranes, leaving behind impurities of heavy metals and compounds such as lead and nitrates called concentrate or reject to be disposed. The product water is so pure that it must be post-treated and blended with other sources for potable supply.

2006 Desalination initiatives

The current study will provide more site-specific analysis of the seven locations that were ranked as "desirable" in the 2002 study. In addition, a wastewater treatment facility will be evaluated for possibly co-locating a seawater treatment plant.

Finally, two or three sites will be recommended for demonstration seawater desalination projects.



Why co-locate seawater treatment plants with other facilities?

- Ability to safely dispose of the desalination reject by blending with available cooling water discharged from the power plant or force main.
- Capital cost savings by shared land, existing potable water distribution facilities, permitted intake and discharge structures.
- Shared labor reduces operational and maintenance costs.
- Early entry into the US desal market and locking in on rising energy costs.
- Land zoning issues are avoided.
- Available warmer source water that reduces the cost of electricity.
- Available electricity on site.
- Available data and reports of environmental impact assessments of existing facilities.
- Use of cooling discharge water without incremental adverse impacts of entrainment, entrapment and impingement on marine life.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Cost savings

Energy is, by far, the largest cost component of operating a seawater desalination facility. Through innovative membrane technologies and isobaric pressure exchangers, operating efficiencies have increased from 50-75 percent in 2000 to about 90 percent five years later. Consequently, energy consumption has dropped over the same period from 15 KWh/1000 gallons to 10 KWh/1000 gallons of water.

Low-energy membranes and innovative pretreatment systems have also reduced operating costs. Co-location with existing permitted facilities creates synergies that lead to about 30 percent savings in capital costs of desalination projects.

Funding sources

- Public financing incentives are available through tax subsidies.
- Federal legislation, H.R. 1071, has been introduced to support seawater desalination as a means of promoting a diversified water resource portfolio.
- The State of Florida's SB 444 alternative water supply grant program qualifies seawater desalination for subsidies that would help defray capital costs.



Roles of the power company, utilities company and SFWMD

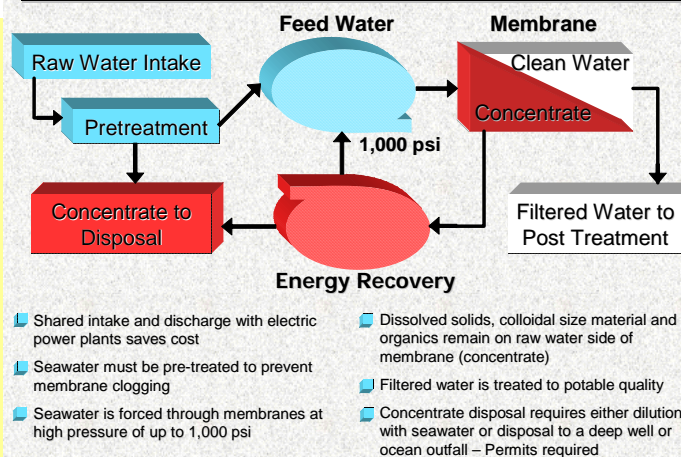
- FPL will lease existing infrastructure, lease or sell land for the desal plant and sell electric power to RO Plant.
- Water Utilities will, either directly, or through special contracts, fund, design, build, and operate desal plants for potable water supply.
- The SFWMD will act as a facilitator and provide regulatory and funding assistance

Selection of favorable sites

Factors that favor the selection of sites include lower salinity and ample quantities of source or cooling water, extended life of co-locating facility, adequate land, proximity to major utility transmission line, and increasing potable water demand in the service areas.

Institutional issues and willingness by partners to co-locate are also important.

Overview of Reverse Osmosis Process



Study conclusions

Seawater desalination has been proven to be technically feasible worldwide, offering a drought-proof and high quality source of potable water. Site-specific economic and environmental factors must still be determined to assess overall feasibility relative to other alternatives.

The South Florida Water Management District (SFWMD) is a regional, governmental agency that oversees the water resources in the southern half of the state. It is the oldest and largest of the state's five water management districts.

Our mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems, and water supply.