



MARLOWE & COMPANY

GOVERNMENT AFFAIRS CONSULTANTS

Memo

To: Marlowe & Company Clients
From: Toby Hicks, Legislative Aide
Re: How to: Pursue funding for a desalination project
Date: March 19, 2010

Background

With water shortages becoming an increasingly common occurrence, local governments often must look to new technologies in order to fulfill the needs of their citizens. One of the most promising technological advances has been desalination, the process that removes salt from water. Although the current desalination costs are high, technological advances may soon overcome that problem. This memo summarizes current desalination implementation options and techniques as well as current potential avenues of federal funding for desalination projects.

Current Desalination Usage

Total desalination capacity is increasing in the United States. Surprisingly, seawater accounts for only 7% of desalination plant usage. More than half of the water desalinated in the U.S. is from brackish water and another 25% is from river water. This is because as the salt content increases in a water source, it becomes more energy intensive, and therefore more costly, to desalinate it. Seawater can but it is up to four times more expensive to desalinate than other water sources.¹ Two-thirds of U.S. desalination capacity contributes to municipal water supplies and 18 percent goes to industrial efforts.

The three states with the largest desalination output are Florida, California, and Texas, with Florida being the leader among the three. Desalinated water comes at a substantial rate increase relative to natural freshwater. The cost of the desalination infrastructure and the cost of the energy used for desalination are the main factors resulting in this rate increase. The cost of energy is particularly troubling since external factors like the price of oil cannot be accurately forecasted over the course of a desalination facility's lifetime.

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Besides the costs associated with desalination, there are health and environmental externalities which must be taken into account. While membrane filtration processes work extremely well and result in a very pure output, that same filtration process may remove elements beneficial to human health and may allow elements through whose impact is detrimental. One such example is that of Boron, which is naturally concentrated higher in seawater than in freshwater and is not filtered out in membrane processes. The long term effects in agriculture and in humans of Boron are unknown, but it results in developmental toxicity in animals among other effects. Every desalination plant's successful operation results in the output of a concentrated saltwater solution which must be disposed of. This is not simple because a higher concentration of salt can lead to the dysfunction and death of sea life within the area. Besides the problem of disposing of this output, the method of input – pumping seawater into the plant – often affect animals nearby through its suction. There is often a high monetary cost associated with protecting the animals vulnerable to this disruption.

Desalination Processes

Developers have a variety of desalination options that they can pursue, each one with various pros, cons, and energy costs associated with it. The most commonly used systems in the U.S. involve a fine membrane that strains the salt from the water such as in the reverse osmosis process. Distillation or boiling the water away from the salt contained in it, is also a commonly pursued globally, but requires more energy. In the U.S., 96% of distillation capacity is membrane based.ⁱⁱ

Desalination Method	Energy Required	Maintenance	Environmental Impact	Usage
Distillation	High	Medium (rust)	Extracted salt or salt slurry disposal can be toxic, water intake can kill animals	Common
Reverse Osmosis	Medium	High (membrane care)		Common
Forward Osmosis	Medium	Medium (membrane care)		None (new)
Electrodialysis	Dependant on water salinity	Medium		Few
Ion Exchange	Low	Dependant on salinity		None (testing)
Freezing Processes	Medium	Medium		None (testing)

Federal Funding for Desalination

Federal funding for desalination is disbursed for both research and implementation. The more pertinent type for local governments is implementation. There is, however, no clearly designated federal desalination program. Most of the estimated \$20-\$25 million in federal desalination funds comes from the Bureau of Reclamation -- which can only be used for projects in the 17 western states. However, some research funds also come from the Sandia National Laboratories, the National Science Foundation, the Army Corps of Engineers, or the Department of Energy.ⁱⁱⁱ

Recent legislative bills that provide funding for desalination planning, construction, or finance include P.L. 111-11, H.R. 88, and S. 1731.^{iv} P.L. 111-11, the Omnibus Public Land Management Act of 2009, directs \$20 million to specifically designated projects: the Rancho California Water District, \$46 million to the Santa Ana watershed (CA), and financial assistance to the California Water Institute to conduct a study coordinating water supplies for the San Joaquin and Tulare Lake regions. H.R. 88, the City of Oxnard Water Recycling and Desalination Act of 2009, authorizes \$15 million federal cost-share funds to provide regional water supply solutions – including desalination – to the Oxnard Plain. Both of those bills are organized under the Bureau of Reclamation's Title XVI

water reuse program. S. 1731, Clean Renewable Water Supply Bond Act of 2009, designates desalination facilities among the types of projects eligible for bonds created by the bill.

There is also the possibility of grant funding for a desalination project. The Department of the Interior's Bureau of Reclamation has provided a number of funding opportunities for desalination projects in the past year, including the Water Desalination Research and Development Program (CDFA# 15.506) and the Water Reclamation and Reuse Program (CDFA# 15.504). For developing and challenged municipalities throughout the country, the U.S. Economic Development Agency is also a potential funding source because the need for clean water is a prerequisite for sustainable economic growth.

Some examples of appropriations earmarks for desalination are:

- In 2010, \$670,000 was directed towards Long Beach, CA's third-phase desalination construction project.^v
- In 2009, \$1,057,000 was directed towards the Long Beach, CA project, \$3,975,000 was directed towards research and development of a regional desalination program in New Mexico, and \$2,400,000 was directed to a military desalination program.^{vi}
- In 2008, \$738,000 was directed towards the Long Beach, CA project and \$4,375,000 went towards a groundwater desalination research facility in New Mexico.^{vii}

Additionally, there have been numerous bills passed in the current congress that include provisions for research that refine current technologies and work to find more efficient desalination methods. Examples of these include H.R. 469, H.R. 1145, S. 1462, and S. 1733.^{viii}

Questions can be directed to your Marlowe & Company team leader, or email legislation@marloweco.com

ⁱ Food & Water Watch. (2009). *Desalination: An ocean of problems*. Retrieved from <http://www.scribd.com/doc/11609006/Desalination-An-Ocean-of-Problems>.

ⁱⁱ Committee on Advancing Desalination Technology & the National Research Council. (2008). *Desalination: A national perspective*. Retrieved from http://www.nap.edu/openbook.php?record_id=12184&page=22.

ⁱⁱⁱ Food & Water Watch. (2009). *Desalination: An ocean of problems*. Retrieved from <http://www.scribd.com/doc/11609006/Desalination-An-Ocean-of-Problems>.

^{iv} Carter, Nicole T. (2009). *Desalination: Status and federal issues*. Congressional Research Service, released on December 30, 2009.

^v Subcommittee on Energy and Water Development. (2009). *2010 Energy and Water Appropriations Bill Conference Agreement Earmark List*. Retrieved from http://appropriations.house.gov/pdf/2010_EW_Conf_Disclosure.pdf.

^{vi} Taxpayers for Common Sense. (2009). 2009 Earmark Database. Retrieved from http://www.taxpayer.net/search_by_category.php?action=search_by_category&category=Earmarks.

^{vii} Taxpayers for Common Sense. (2008). 2008 Earmark Database http://www.taxpayer.net/search_by_category.php?action=search_by_category&category=Earmarks.

^{viii} Carter, Nicole T. (2009). *Desalination: Status and federal issues*. Congressional Research Service, released on December 30, 2009.