

*“Carrier-Gas Enhanced Atmospheric Pressure Desalination (Dewvaporation):  
Economic Analysis and Comparison to Reverse Osmosis and Thermal Evaporation”*  
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## Abstract

With freshwater resources stretched thin, James Beckman of Arizona State University developed carrier gas-enhanced atmospheric pressure desalination, or simply “dewvaporation”, which presents a viable option to easing water demands.

Dewvaporation works by evaporating pure water out of seawater with dry air. This now humid air condenses the pure vapor while donating its heat to seawater aiding in evaporation for the next cycle. This works to recycle heat and therefore gives it an advantage over common thermal separation.

A mathematical model composed of differential equations made possible a description of the process as well as an economic analysis. The results of this analysis predict a fixed annual cost of about \$1867 for a unit producing 1100 gal/day. This corresponds to a cost of about \$2.59/1000gallons. However, this cost considers using steam to heat the air stream across the top of the tower. Cheaper methods may exist that utilize solar power or waste heat from an existing plant.