# The Desert Vapor Tube: A 1 km Tube Which Desalinates Ocean Water by Using Solar Power

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The Desert Vapor Tube is a 1 km tube which desalinates ocean water by solar power. It is our answer to the need of drinking water in poor developing countries since it uses sustainable energy. This relatively cheap and low-maintenance tube can be used along the coasts of hot countries. Ocean water is pumped through this tube where both vaporization and condensation produces clean water. The research included heat transfer theory, tube design, building (part of) the tube and testing its effectiveness under real circumstances. Four design alternatives have been compared and two have been tested. Design option 1 consist of an inner half open pipe with cooling triangles beneath. Sea water flows into the half open pipe, vaporizes partly and subsequently the water vapor condenses on the relative cool triangles beneath and will be drained off immediately. In this design we get an equilibrium of water vaporizing and condensing at the same time at the same zone inside the tube. Design option 2 is less sophisticated and consists of two zones: in the hot section sea water vaporizes, a fan moves the vapor to a relative cool zone downstream the tube where it condenses onto heat transfer pipes which are cooled by sea water. Design option 2 appeared to be more effective during our tests, however design option 1 is more scalable. Maximum clean water rates of 16.7 ml per hour have been achieved using a tube size of 15 cm diameter and 1 meter length at 40 °C ambient temperature. Scaled up to a 1 km tube with a diameter of 1 meter clean water rates up to 111 liters per hour may be expected.

**Awards Won:**