Developing an Economically Viable Desalination Device for Individuals in Developing Countries

O'Neill, Oisin (School: Oatlands College)
Henderson , Darragh (School: Oatlands College)

40% of the world’s population experiences water scarcity, this figure will only grow with climate change. Wells give many people access to water, but there are an increasing number of circumstances in which wells are not viable. We are trying to solve water insecurity for people in developing nations by developing a self-powered, environmentally friendly, desalination device costing less than €300. After preliminary studies we decided that a distillation system would work best as it is simple, does not have any disposable, or finite parts, such as filters, and also purifies water of all substances with a boiling point above 103°C. Experiments were conducted to determine the power consumption required by the device, with a goal of desalinating 10L of water a day (based on average conditions in Somalia). We then conducted several experiments to determine the necessary condensing power. We have also designed this device to be rugged and simple, to ensure that it won't break easily, and if it does it does not need a specialist to repair. This will increase the lifetime of the device, and therefore lower the price per liter. Energy consumption was a significant challenge, as solar panels are expensive, more watts could not be afforded, instead we developed a component that will follow the sun with the solar panel. Our results show that: - The device can vaporize 1 liter of 40°C seawater in 54 minutes with 1100 watts (hypothetical maximum solar panel output). - The device can vaporize 1 liter of 40°C seawater in 108 minutes with 550 watts (probable minimum solar panel output). - We concluded from this that a desalination device could be a major help to many people, it is possible to produce the device, for under €300 and it can desalinate 1L of saltwater per sunlight hour.

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