

Memorandum about HDH desalination.

It seems to me that solar mini plants for desalinating water by HDH method (damp air) are undervalued now. Meanwhile, 10-30 litres of fresh water per day is very important for millions of families in Africa and Asia. You can desalinate not only sea water also contaminated surface water (rivers, lakes etc) or brackish groundwater. Problems are only in reducing the cost of plant, an ability to work without electricity and in solving problems of scale. Then the problem of the efficiency of the process becomes unimportant.

These problems are solved in technology tested by me. Process consists of broaching the maximum possible amount of atmospheric air through the surface distributed heater-humidifier (900 W/m² and more) heated by the tropic sun and then cooling it by a natural way with falling dew.

In cheapest version of heater-humidifier the tubes (even flexible thin-walled plastic) laid on the ground, filled with black sand and covered with a transparent film, and the airflow is provided by means of two-bladed wind turbine, whose high-speed propeller is made from a piece of plastic pipe (my Russian patent RU 2386852 C1). The air flow through the proportioner (ejector) and captures itself the required amount of water for evaporation.

At an average wind speed of 4 m/sec we will have a flow of damp air through the humidifier about 4 m³ per hour with a temperature nearby 90... 95 °C. Condensation brings us 1.2 liters of fresh water per hour. All it costs less than \$ 30 and works for many years. In my test prototype, after 1 month of working with sea water scale is not detected. Bacteria also.

If instead of a wind turbine we shall use sea waves and inverted empty barrels, then the plant capacity can reach hundreds of liters of water per hour, because one barrel as air pump flows 30...40 cubic meters of air per hour at wave with 0,5 m high. Then a battery of 20 barrels can give 1ton of fresh water per day.

Generally speaking, the flow of air through the desalination plant can create any engine that uses renewable energy, such as a redesigned low-temperature Stirling sun engine, flow of the river, waterfall etc.

Of course, for a large air flow may require a highly efficient evaporator. Then you can use prefabricated solar heaters with a heating agent. In this case, the evaporator is placed in a separate container and rolled into a spiral of Archimedes.

Once again I want to emphasize that simple and reliable HDH plants can not only be installed, but also PRODUCED at any point on the Earth from a small amount of specially supplied parts and scrap materials. Also, do not forget that the temperature (about 90... 95 °C) of cycle HDH sterilizes the water from bacteria and parasites. So it can be used for groundwater remediation.

