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## Aqua Tower

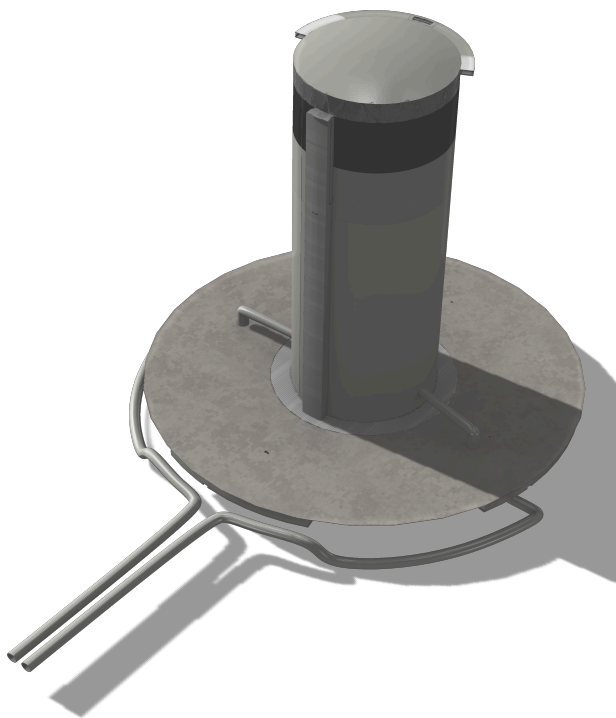
Aqua Tower is a patent pending, superior to other designs solution for production of water and electricity in vast quantities. It is more efficient, cheaper to build and operate, solving the challenge of water security.

For oil-producing countries the Aqua Tower is a domestic energy source that frees up valuable energy export revenues.

Aqua Tower is a self-sufficient system that harnesses solar and wind energy and will work 24/7 at a cost lower than renewables and comparable to best in class hydrocarbon solutions.

Aqua Tower can also utilize waste heat from thermal power plants.

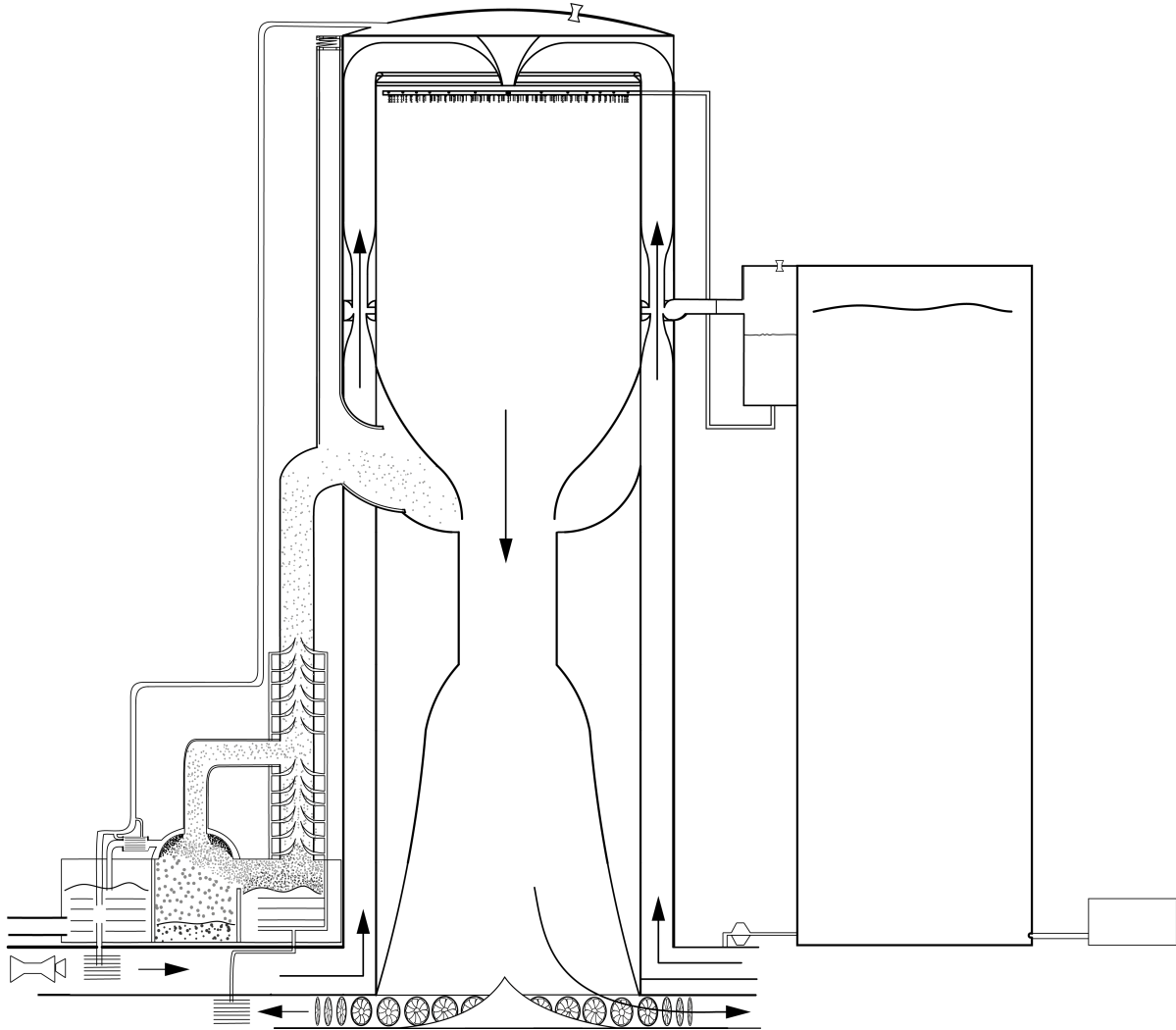
The annual production (desalination) of water, in a single unit is estimated to exceed 500 million cubic metres excluding the production of sufficient amount of electricity for pumping and other needs.





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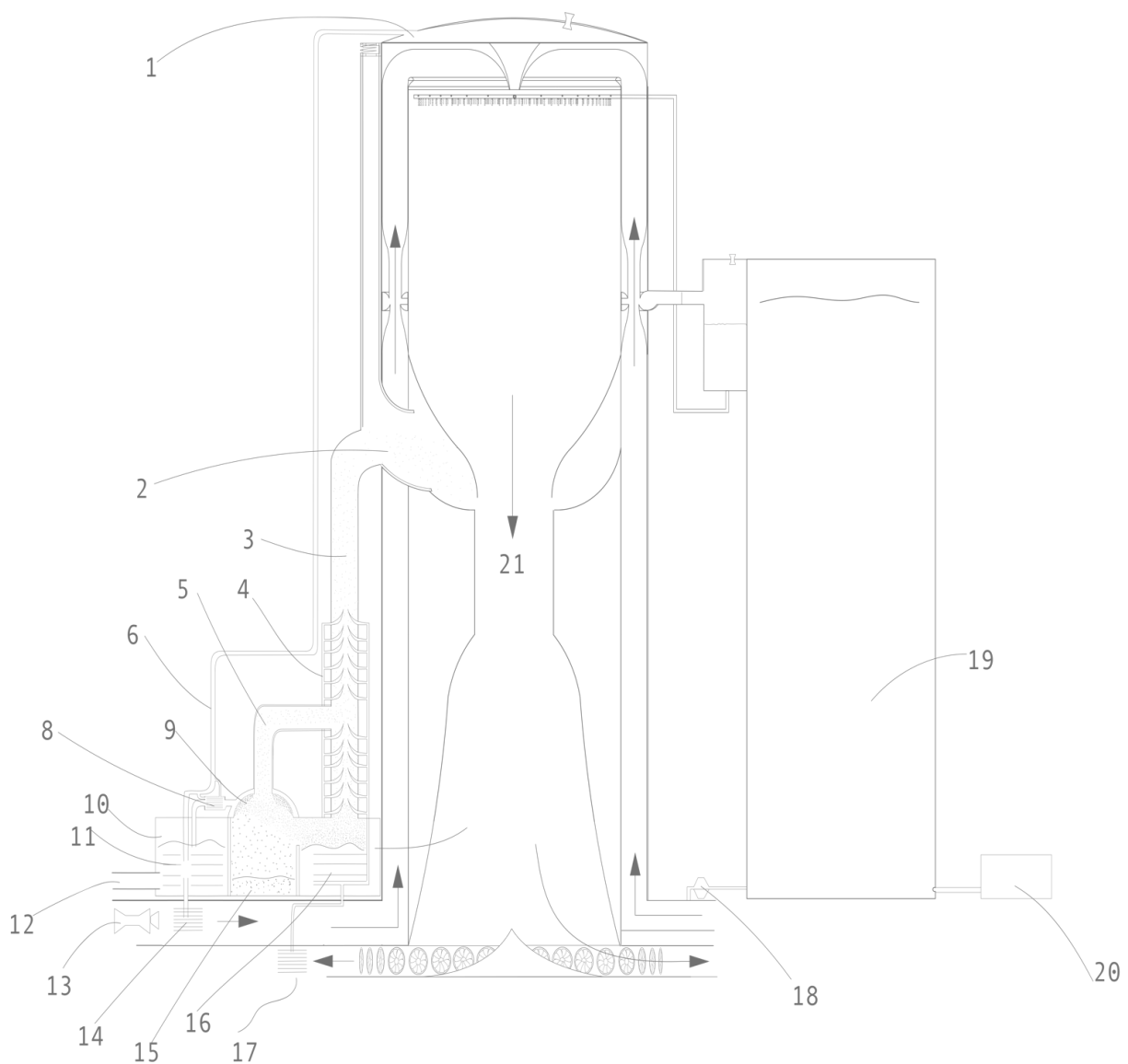
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## Aqua Tower - How it works

Aqua Tower is a tall, straight construction whose power system is based on the natural laws of thermodynamics.



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It is optimized for few dimensions. The smallest one presented here is nonetheless a tall construction with a height and diameter of 645 respectively 145 meters. The only input to Aqua Tower is seawater (and waste heat for increased efficiency of existing thermal power plants).

### The electricity production

Hot, dry air enters through the intakes 22, it passes through the De Laval tapering at 23 and reaches the water spray - and cooling nozzle system 24 at the top of the tower. Heated air also flows from the top of the tower 1 to the sprayed water zone 24. The sprayed water at 24 creates a cold zone making the hot air from 22 and 1 to rush to 24. When the sprayed water and air mix, the condensed, now colder, air falls inside the tower (downdraft) at very fast speeds. The rushing air powers the turbines 25 when it reaches the bottom.

### Water production – Vacuum

The down flowing air inside the tower increases even more in speed through De Laval tapering at 21 which causes a negative pressure ( $<0.5$  bar) at 2. The throat section 2 is connected to the water desalination chambers 26 and 27 through the pipes 3 and 5. Adjacent to the chambers 26 and 27 is the seawater chamber 10 receiving water from pipe 12. The water at seawater chamber 10 is heated from the waste heat source 13 (optional) through the heat exchanger 14 as to approximately  $50^{\circ}\text{C}$ . The water in chamber 10 is also heated from the Concentrated Solar Power System 1 through pipe 6.

From seawater chamber 10 the heated water flows to the vacuum chamber 26 through pipe 28. The pipe 28 passes through a liquid / electric heat exchanger 8, heated by the Concentrated Solar Power System 1 (during nights or if Aqua Tower is not connected to a waste heat source 13). The seawater is sprayed at the vacuum chamber 26 and evaporates rapidly.

Fresh water chamber 27 which is connected to vacuum chamber 26 has the same low pressure as chamber 26 but is cooled by the heat exchanger 17 which in turn is cooled by the Aqua Towers cold and moist high speed air from the turbines 25.

Because of the colder temperature at chamber 27, the hotter vapour at chamber 26 will consequently rush to fresh water chamber 27 where it condenses due to the colder temperature.

The highly salt concentrated water (the brine) falls naturally down 15 in chamber. Brine is passed-off for disposal processing.

### Water production – Reverse Osmosis



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