

## NECESSITY IS THE MOTHER OF INVENTION



My name is Taun Richards. In the field of Lepidoptry, I am known as the Butterfly Whisperer. My water generators are my personal contribution to making the world a better place. Allow me to explain how they work.

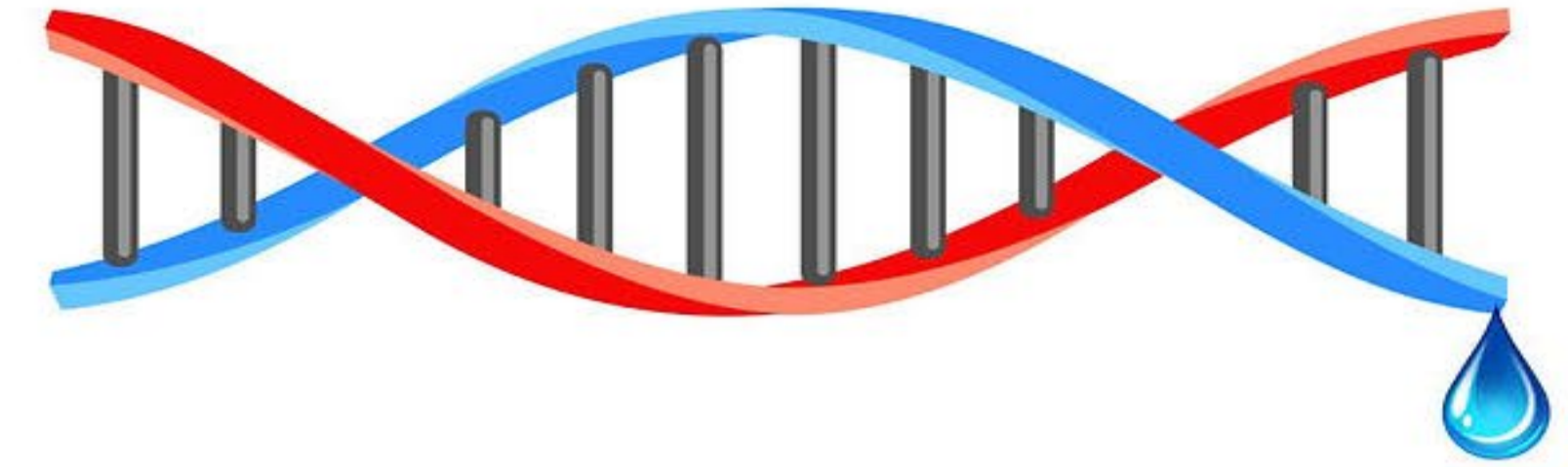
Air behaves like a sponge; the warmer the air temperature, the more water the sponge can hold. The colder the air temperature, the less water the sponge can hold. To wring out the sponge, I have to subject warm air, to a cold environment.

The by product of a temperature exchange, is water, in the form of condensation. An atmospheric water generator is a machine that is dedicated to extracting water moisture from the air.

My water generators leverage the natural principles of radiation, conduction, and convection, to extract water from the air, using the least amount of energy possible. The entire system is self-powered and runs on 12 volt D.C.

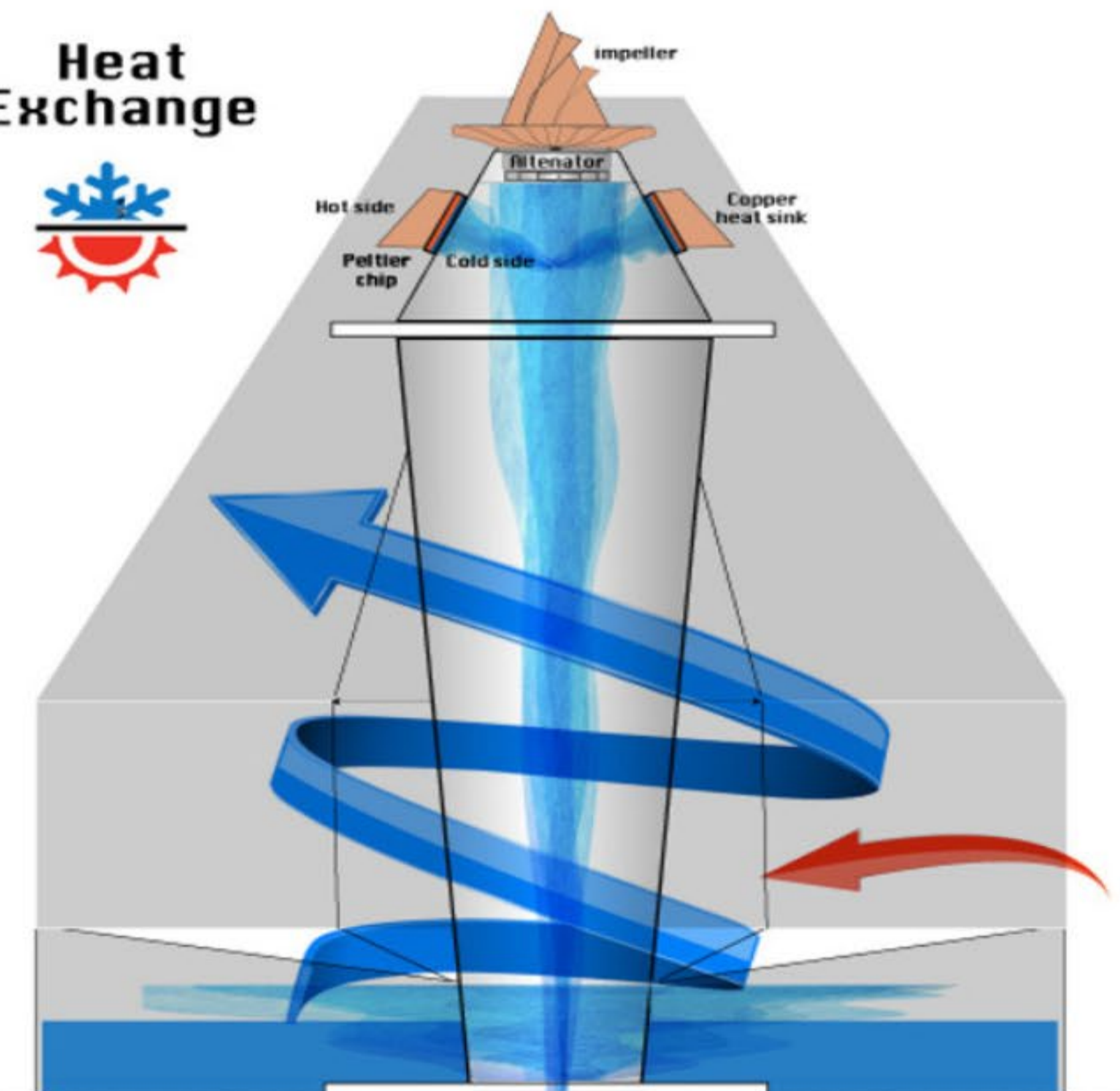


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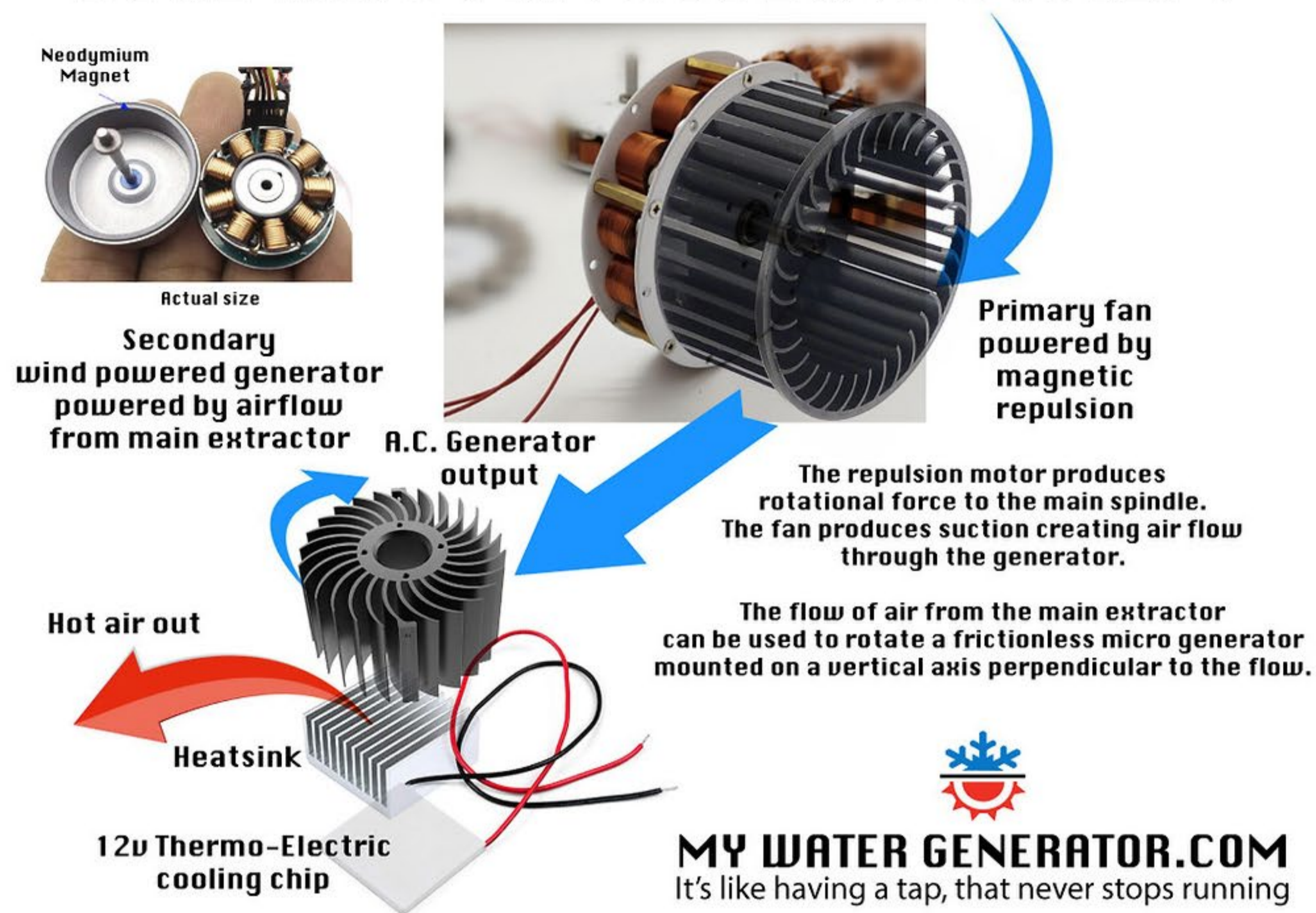


Leveraging the natural principles of radiation, conduction, and convection.

**Heat Exchange**



## DUAL AXIS FAN COOLING SYSTEM



## THE PELTIER EFFECT

When a voltage is applied across joined conductors, and heat is removed at one junction, a cooling effect occurs. This is known as the Peltier effect. By leveraging the Peltier effect, it is possible to produce extremely low temperatures, down to -40C, using only 12 volts of D.C. current.

A solid state refrigeration system has no moving parts. This makes the generators ultra reliable and easy to maintain. The modules produce a rapid cooling effect the moment current is applied and the temperature of the module can be managed by a thermostatic controller.

A Peltier cooling module, is a solid-state active heat pump which transfers heat from one side of the device to the other, depending on the direction of the current. Reliability and energy efficiency are the key components of solid state refrigeration.

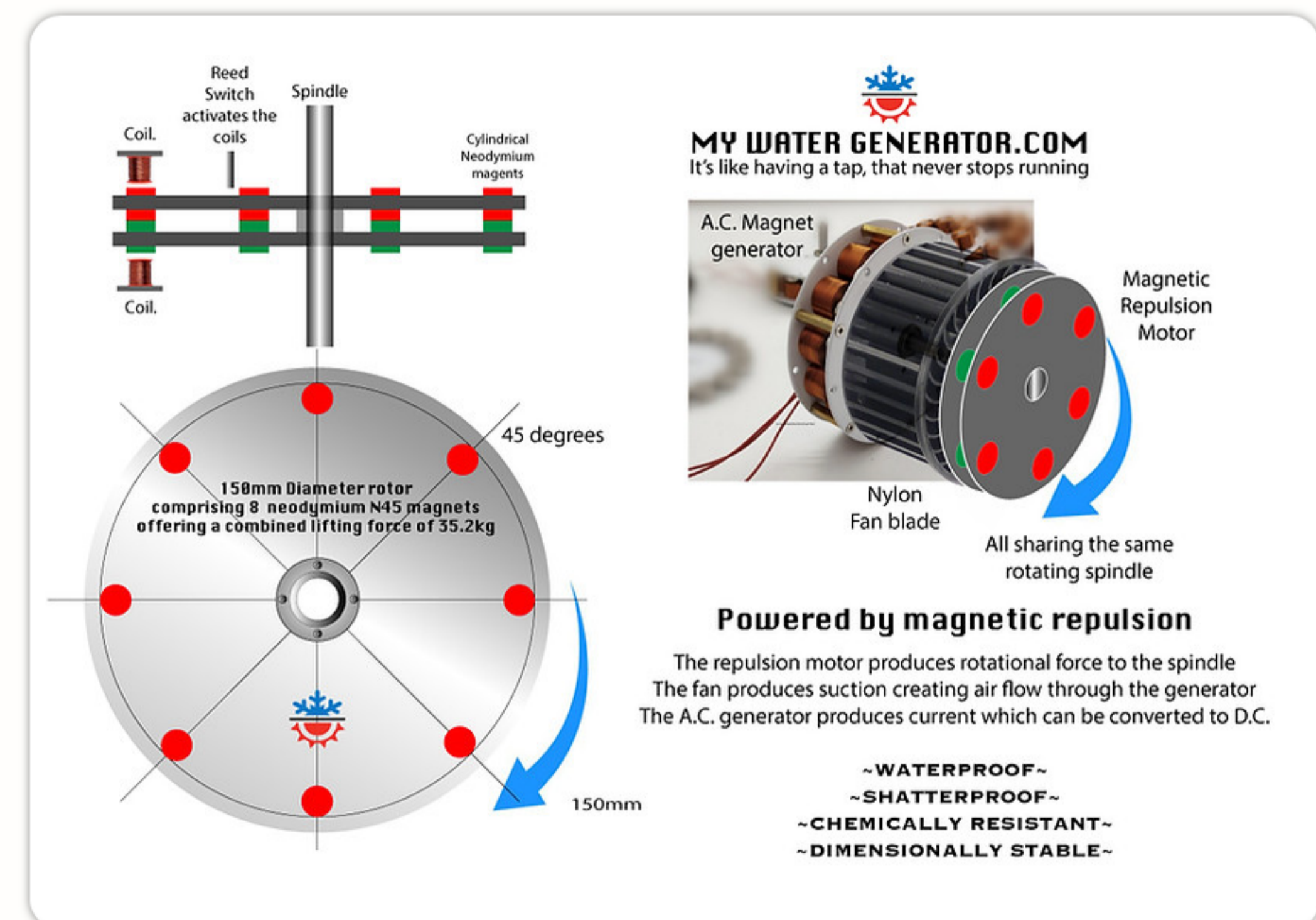
The thermoelectric cooler assembly is up to two times more efficient than a compressor-based system in all test conditions



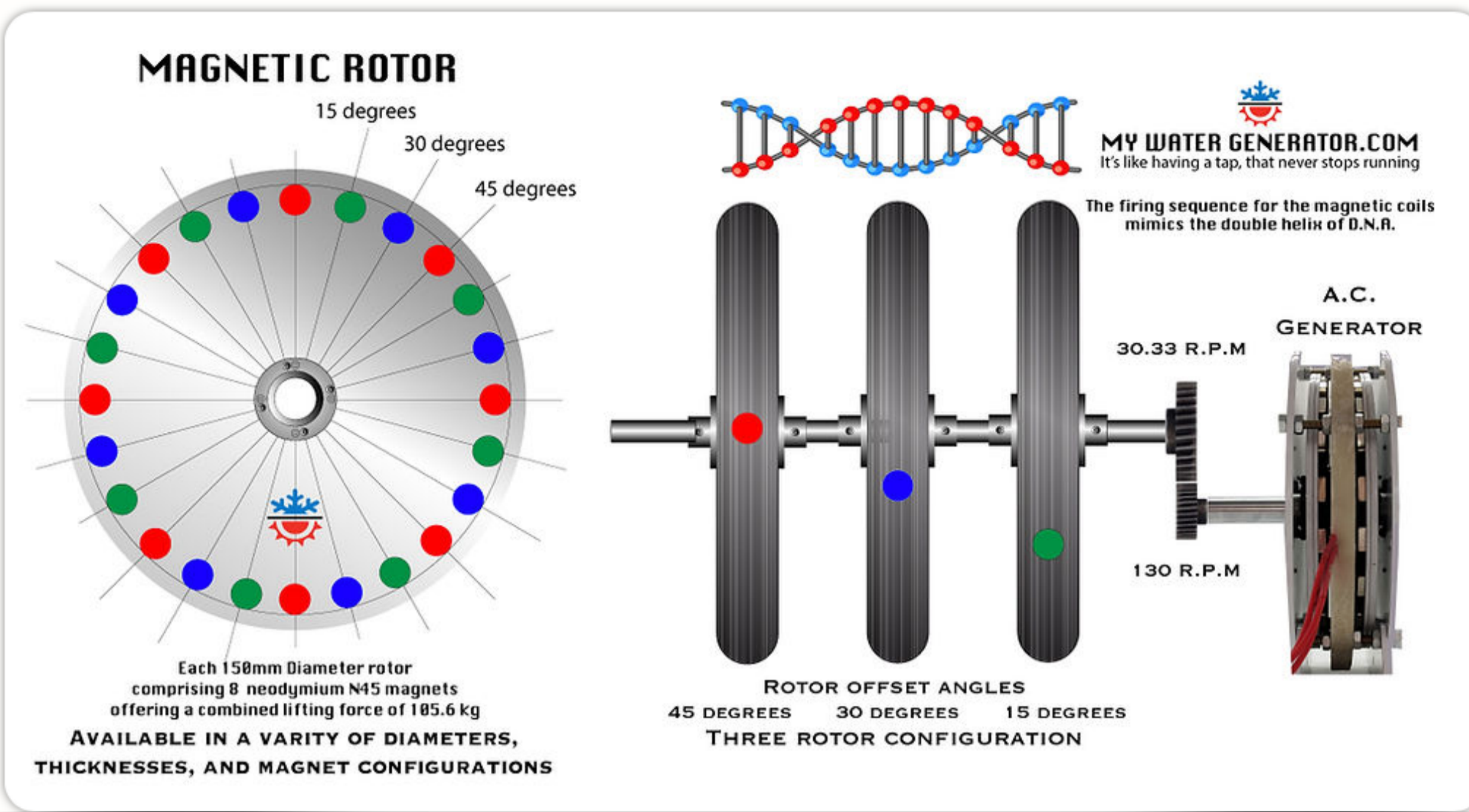
## EXTRACTION BY REPULSION

A magnetic repulsion motor works by switching power to a coil, to produce an opposing magnetic field to that of the fixed magnets on the spinning rotor.

As the magnets on the rotor approach the coil, a sensor activates a switch that allows current to flow. The precisely timed pulses of electrical current, keep the rotor spinning.



*In 1975 the Chairman of the New Zealand Institute of Electrical Engineers, Robert Adams, filed for a patent on a new type of highly efficient motor / generator that utilized the power of permanent magnets. He achieved an energy efficiency of 800%. In other words, it made far more energy, than it used...*



Torque is a measure of the force that will cause an object to rotate about an axis. A magnetic rotor will produce torque when in the presence of an opposing magnetic field. How much torque, depends on the strength of the magnets in the rotor. When a number of rotors are placed on the same axis, and each rotor is offset at an angle of 15 degrees, the firing sequence of the coils mimics the double helix of DNA.

The key to efficiency is to produce rotational force as economically as possible. Nothing does this better than magnets. The firing sequence creates very high torque, at very low R.P.M. A spindle rotating at 30 R.P.M. can produce a rotational speed on the generator spindle of 130 R.P.M. using just two gears.

Magnetic rotors are available from the [online shop](#). Custom configurations can be made to order.

## SOLAR PANELS PLUS WATER

The objective of a solar farm is to generate electricity, but when you know that from the exact same footprint, you can also generate water, why not produce both?

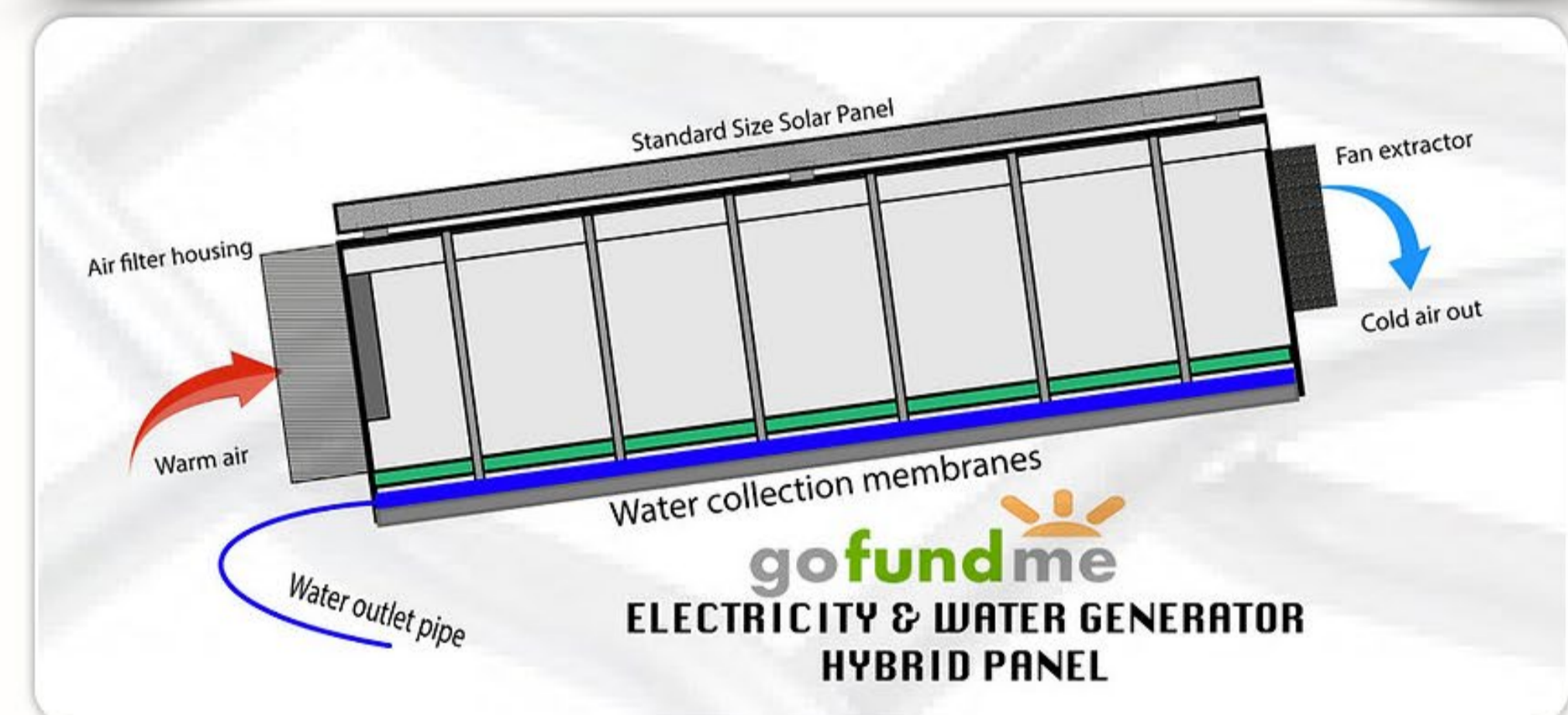
A flat panel water generator can be retrofitted to existing solar installations to allow for the production of water. The relatively small drop in electrical output, is more than compensated for by the production of water.

Solar panels are arranged in rows, at angles between 30-45 degrees from horizontal. At an angle of just 2 degrees from horizontal, water starts to move downhill. As water builds up inside the membrane, it constantly collapses under its own weight, and runs into the collection plate.

Dust and dirt can dramatically reduce the efficiency of solar panels. The solution, is to apply a hydrophobic coating to prevent dirt from sticking to the surface. The coating improves efficiency, by improving the quality of light on the panel surface.

The nano-coating is easy to apply, and very long lasting. The protective surface is specifically formulated for solar panels, but it can also be applied to any glass surface, including shower screens, mirrors, swimming pool enclosures etc.

A washing solution that prepares the surface prior to application of the nano-coating is also available through the [online store](#).



**HYDROPHOBIC NANO COATING  
PREVENTS DIRT FROM STICKING TO SOLAR PANELS  
AND OTHER NON POROUS SURFACES.**

**DUST AND DIRT REDUCE  
THE EFFICIENCY OF SOLAR PANELS**



**OUR NANO COATING PREVENTS  
DIRT FROM STICKING TO PANELS**

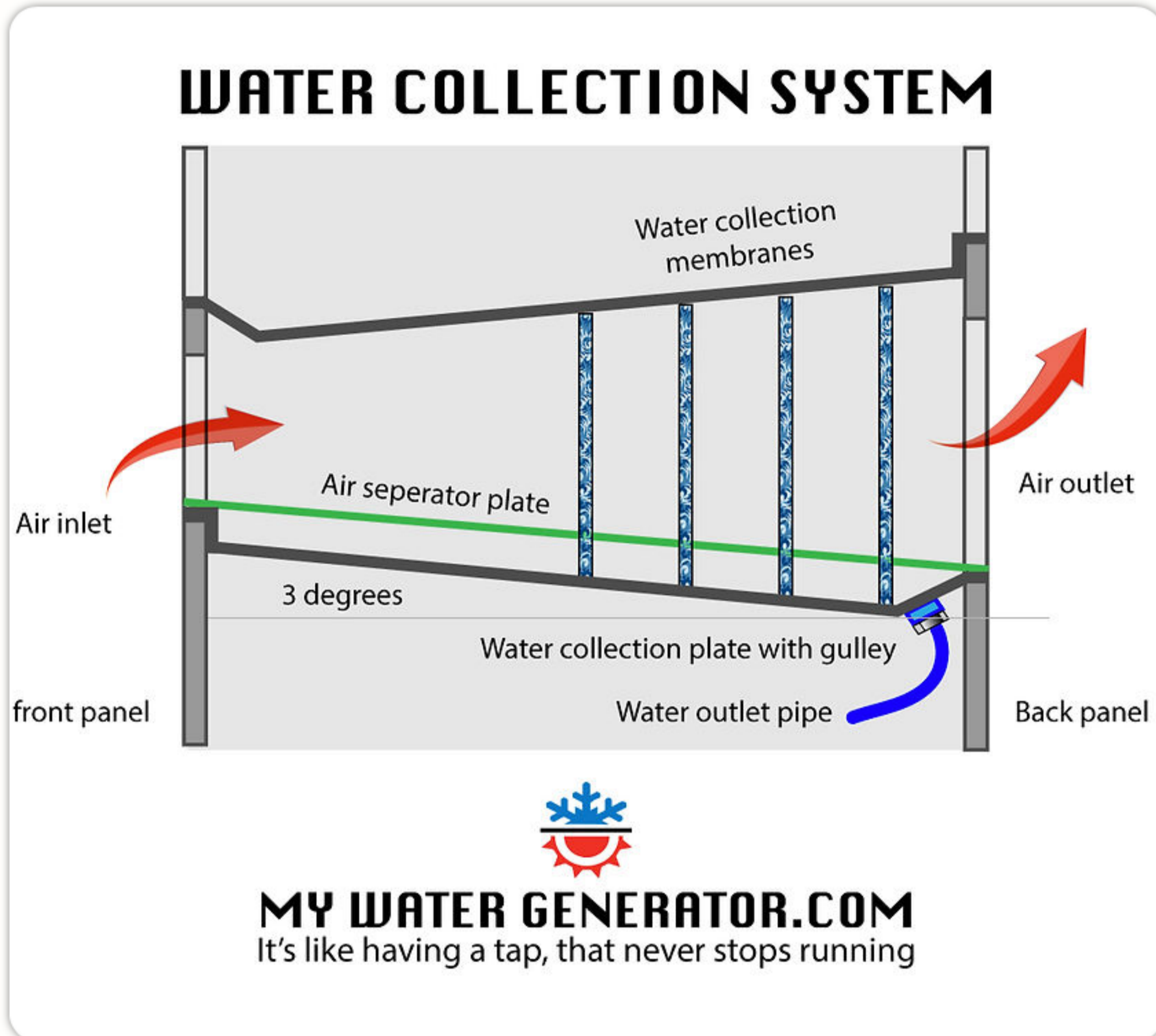


**\* IMPROVES SOLAR PANEL EFFICIENCY**  
**\* REDUCES THE NEED TO REGULARLY CLEAN**  
**\* IMPROVES QUALITY OF LIGHT REACHING SOLAR PANEL**  
**\* PROTECTS YOUR VALUABLE INVESTMENT**

## WATER NUCLEATION

An effective method for encouraging water nucleation, is to use a fine mesh membrane that combines hydrophobic, and hydrophilic properties. Hydrophobic materials repel water, hydrophilic materials attract water.

Test results show that spraying a woven stainless steel mesh with PA6 nano fibres, doubles the volume of water collected over the same time period. This is a significant improvement in collected volume, for very little effort and expense.



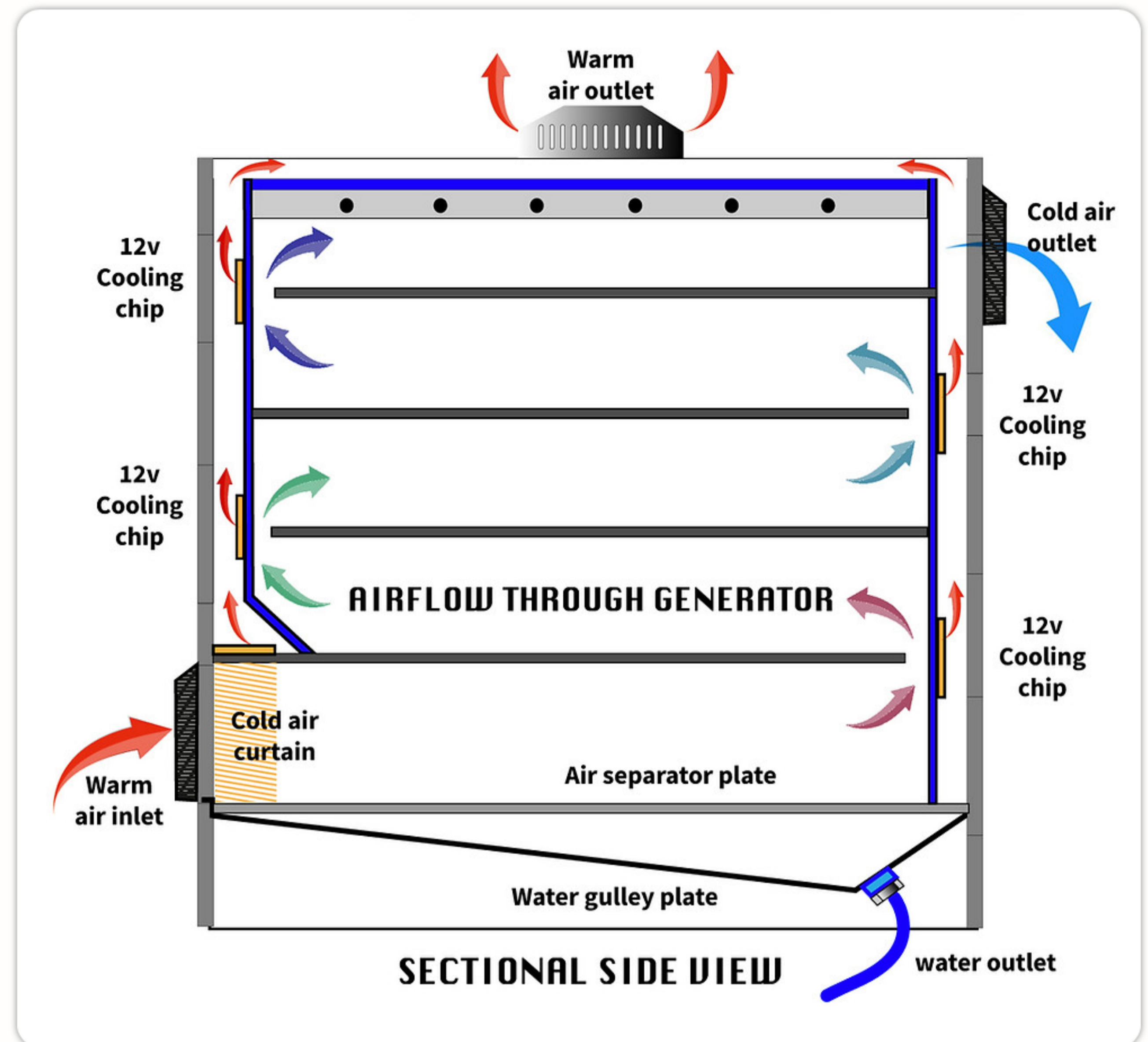
A beer tap is a good example of the natural principles in action. Warm air condenses on the cold surface where droplets of water form. The weight of the water drop causes it to run down into the collection tray underneath. Nothing else in the bar is wet, and yet everything is in contact with the same air.



# THE EXTRACTION PROCESS

For an atmospheric water generator to be effective, the temperature inside the condensing chamber must be lower than the temperature of the air outside. This is relatively easy to achieve when the generator is switched off, but when hot air is being constantly processed, the temperature differential has to be sustained.

As hot air comes in at the bottom, this is where the cold temperature is needed the most. A cold air curtain starts the cooling process. As air travels through the generator it cools, and as it cools, it releases moisture. The moisture will naturally collect at the bottom of the enclosure.



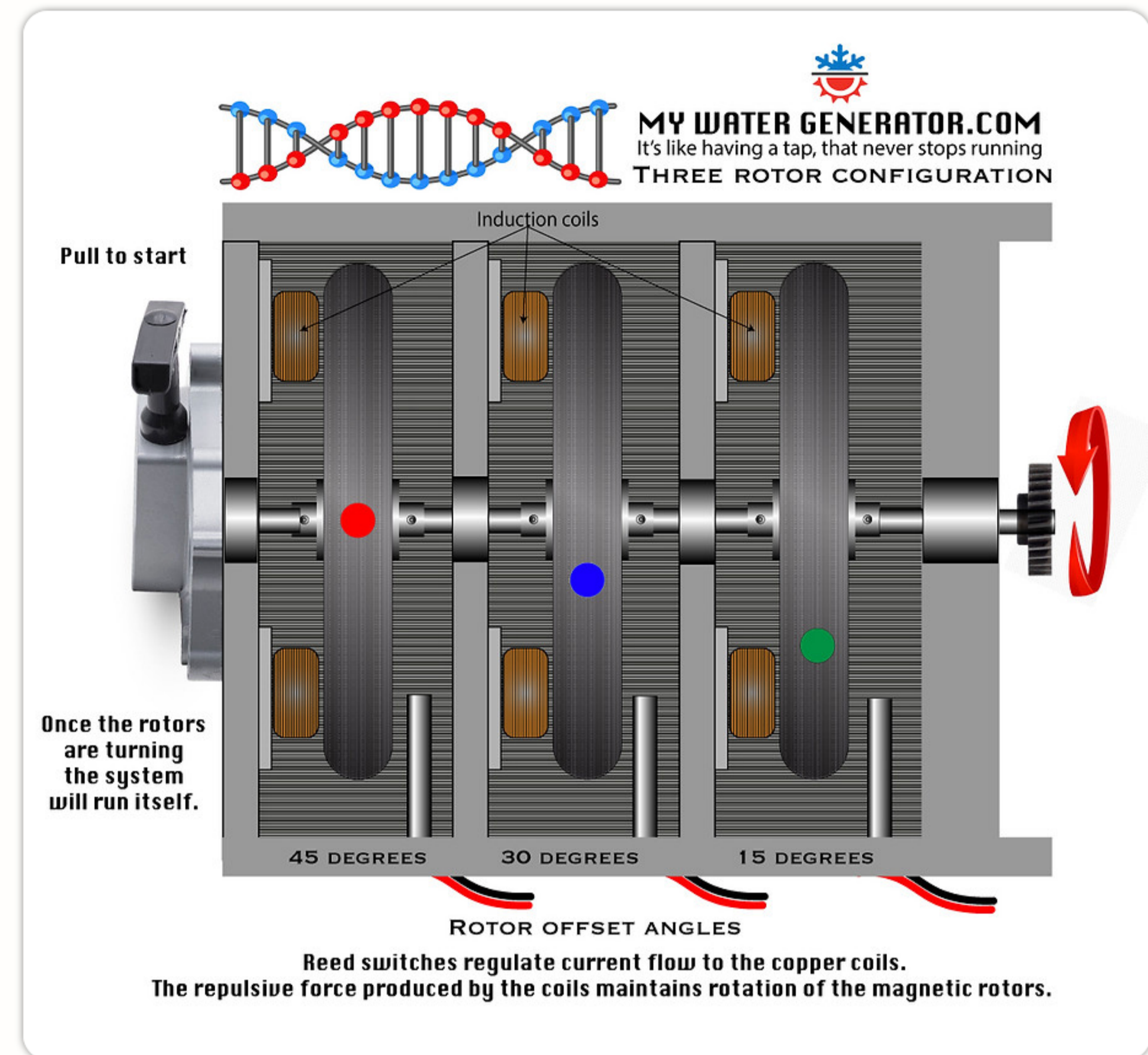
The hydrogen bond that holds water molecules together is responsible for many of its properties, including its ability to resist temperature change. Water membranes provide resistance to air flow and as the air passes through the membrane, it finds many surfaces to start nucleating.

# PUMPING IRON

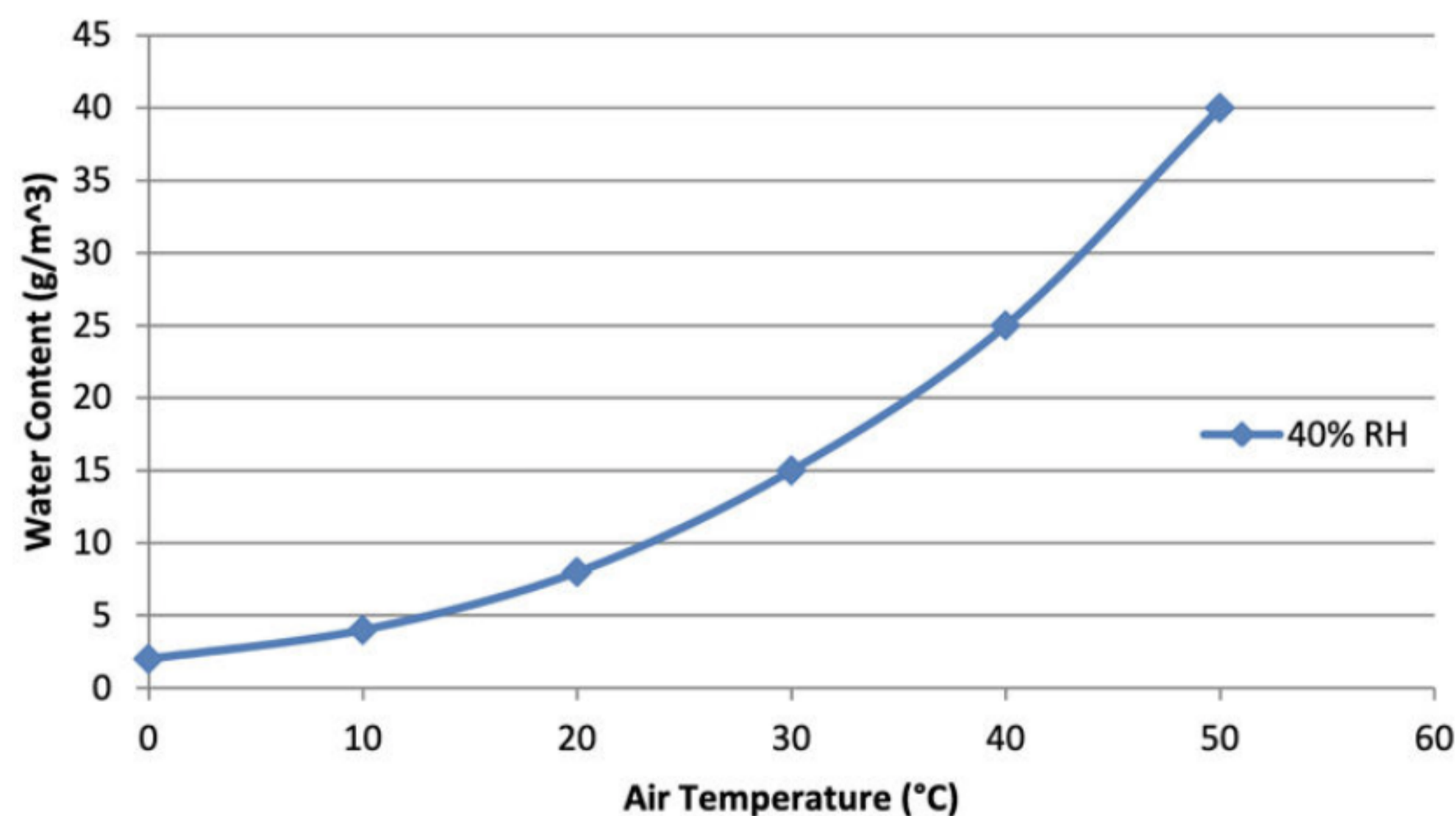
Drilling a hole into the ground to extract water is extremely costly, and very energy intensive. The up front cost can be as much as €45,000.

Extracting water from the air is like squeezing a sponge. There is hardly any resistance at all, so I do not need to use a lot of energy to accomplish the task. More importantly, the atmospheric ocean will never run dry.

Drilling into the ground may provide customers with water, but at a considerable cost to the environment.



**Water Content against Temperature for constant Relative Humidity**



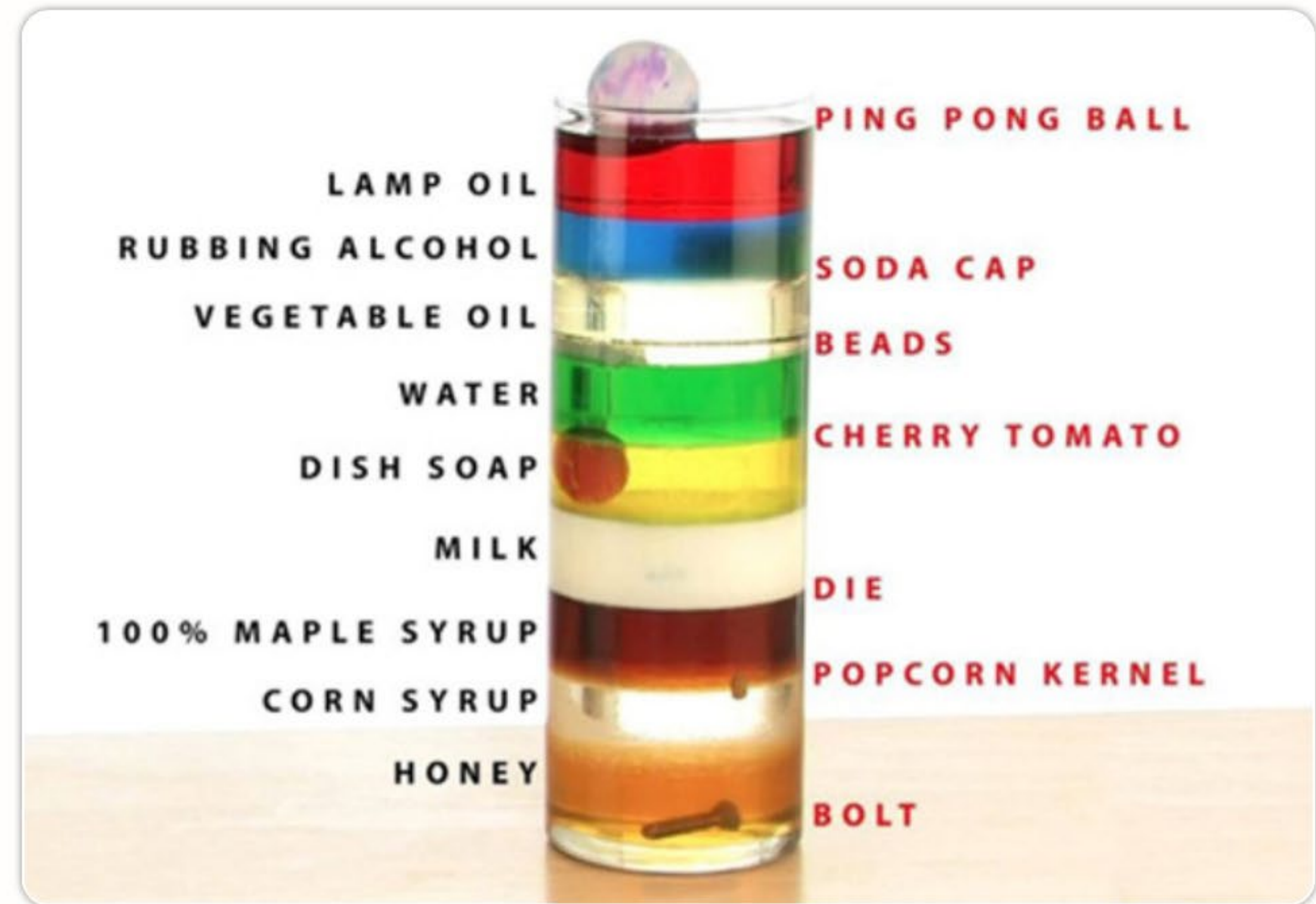
By encouraging people to extract water from the atmosphere, we can reduce the volume of ground water being used. If this approach is adopted, and in large enough numbers, it will be possible to completely reverse the effects of drought caused by low ground water levels. Plants and trees know what to do, they just need the water to do it.

A solar powered Aqua panel water generator, is designed to be mounted directly to a bulk container. The unit is completely self powered and produces water 24/7.

## RELATIVE DENSITY & HUMIDITY

Hot air rises, cold air sinks. This is one of the immutable laws of thermodynamics.

Lower temperatures leads to higher density, and higher temperatures leads to lower density. This is because warmer molecules of air move faster, creating an expansion effect that decreases air density. The density of one medium, relative to another, determines its position within a column.



Relative humidity describes how full the sponge is, at any given temperature.

At 20°C and (60%RH), 1m<sup>3</sup> of air contains 13 grams of water. 1 litre of water weighs 1000 grams. To extract one litre of water, I have to process a minimum of 83m<sup>3</sup> of air. A typical ducting fan can push 1220m<sup>3</sup> of air per hour. Based on the above temperature, relative humidity, and air flow rate, the maximum yield possible would be 168 litres per day.

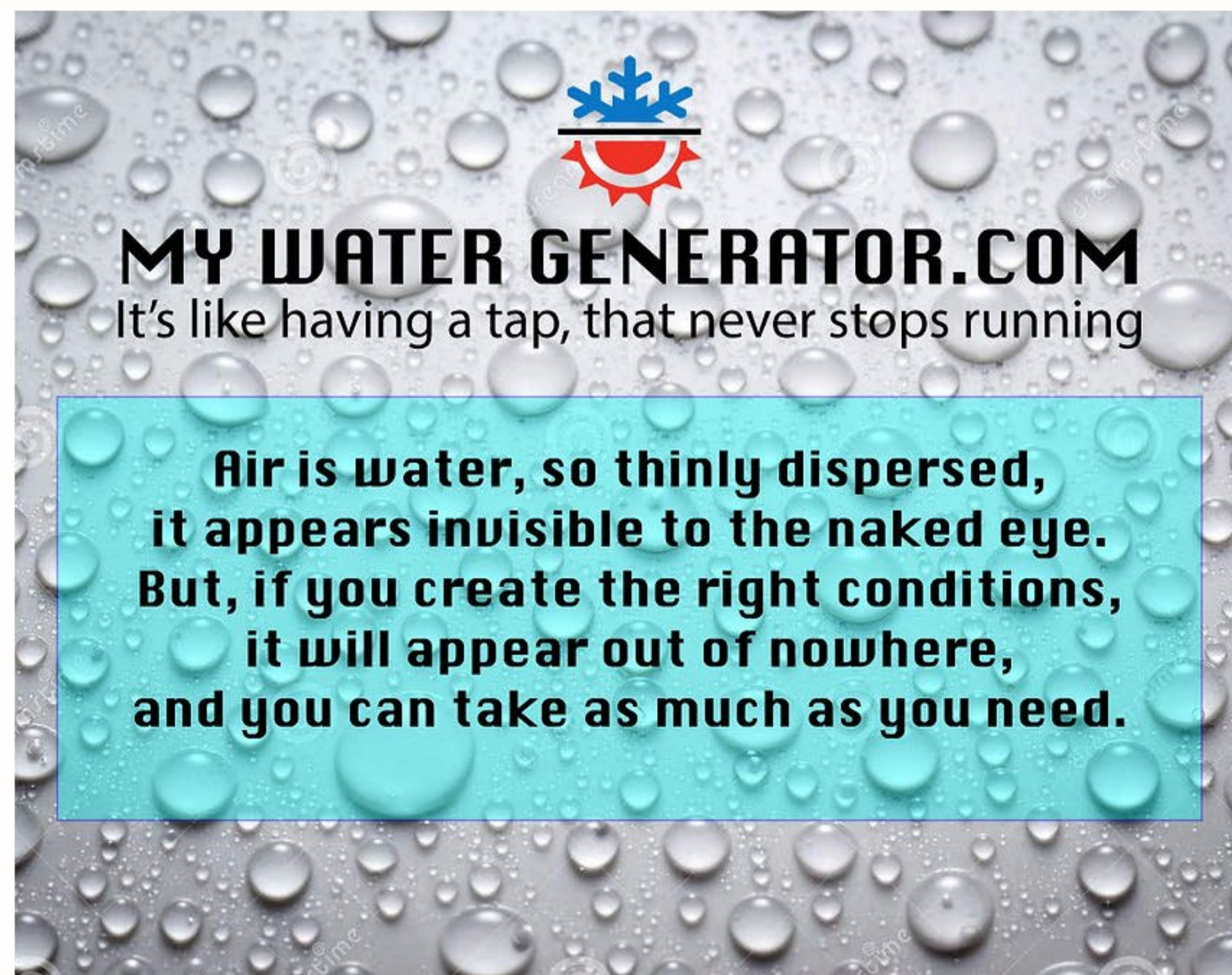
At 30°C and (100% RH), 1m<sup>3</sup> of air contains 30 grams of water. To extract 1 litre of water, I have to process a minimum of 33m<sup>3</sup> of air. At these values, the same air flow rate would yield a maximum of 720 litres per day.



Water is the universal solvent for all forms of life on Earth. As a consequence, a prolonged absence of water has a profoundly negative impact on all forms of life on Earth.

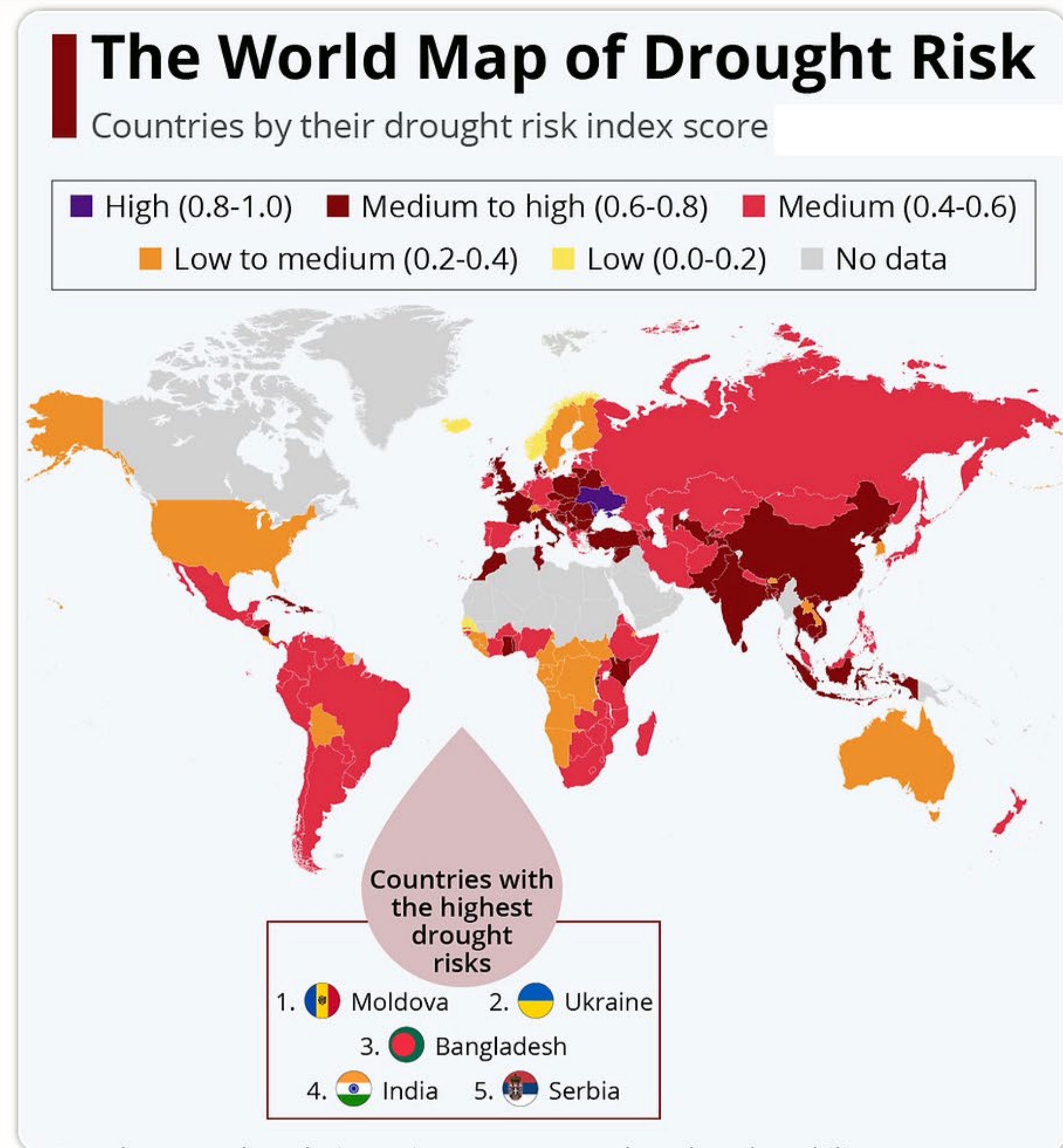
One of the most important lessons to learn, is that plants and trees create their own micro-climate. As long as there is sufficient water under the ground, there will never be a problem on the surface.

Trees act like giant straws sucking water from deep below the ground, raising it high into the air, where it evaporates from the surface of the leaves as an invisible mist. All they need to accomplish this task, is groundwater.



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**Air is water, so thinly dispersed, it appears invisible to the naked eye. But, if you create the right conditions, it will appear out of nowhere, and you can take as much as you need.**



Soil is the living 'skin' of the Earth. The roots of trees act like giant sponges which keep the soil constantly moist. Cutting trees down kills the sponges below the ground, when the sponges die, the skin starts drying out. Once a process of desertification begins, it's very hard to stop.

Atmospheric water generators are a simple solution to a complex problem. The technology is very reliable, the units are energy efficient and, more importantly, the atmospheric ocean will never run dry.



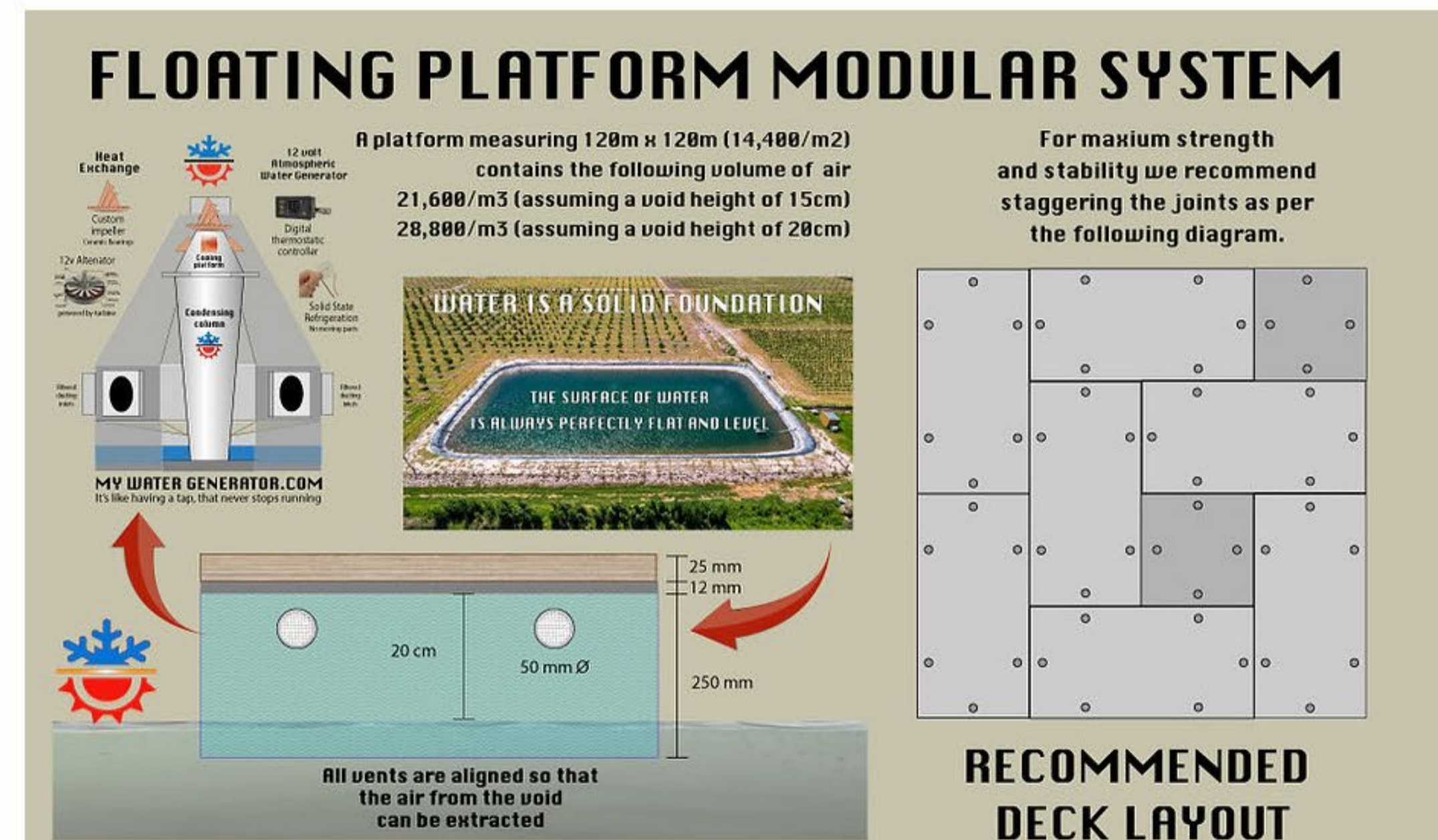
Aquaponics is a cooperation between plants and fish. Hydroponics is a way of growing plants without soil. In both cases the plants derive all the nutrients they need from the water the plants are growing in.

In the case of Aquaponics, the waste that the fish excrete is converted into nutrients which nourish the plant. In turn, the plants consume the nutrients which helps to purify the water. The relationship is entirely symbiotic.

Evaporation is a problem that affects all standing bodies of water. My floating platforms can refill reservoirs with water extracted from the atmosphere. The volume of water that can be generated is in excess of 20,000 litres per day, or 7,300,000 litres per annum.

In addition to their role as water generators, the floating platforms can be used to grow plants, and fish. The modular format make them quick and easy to assemble.

Because plants roots act like biological filters, the overall quality of water will be improved. Also, the water that is being introduced back into the reservoir increases oxygen levels in the water the same way a waterfall does.



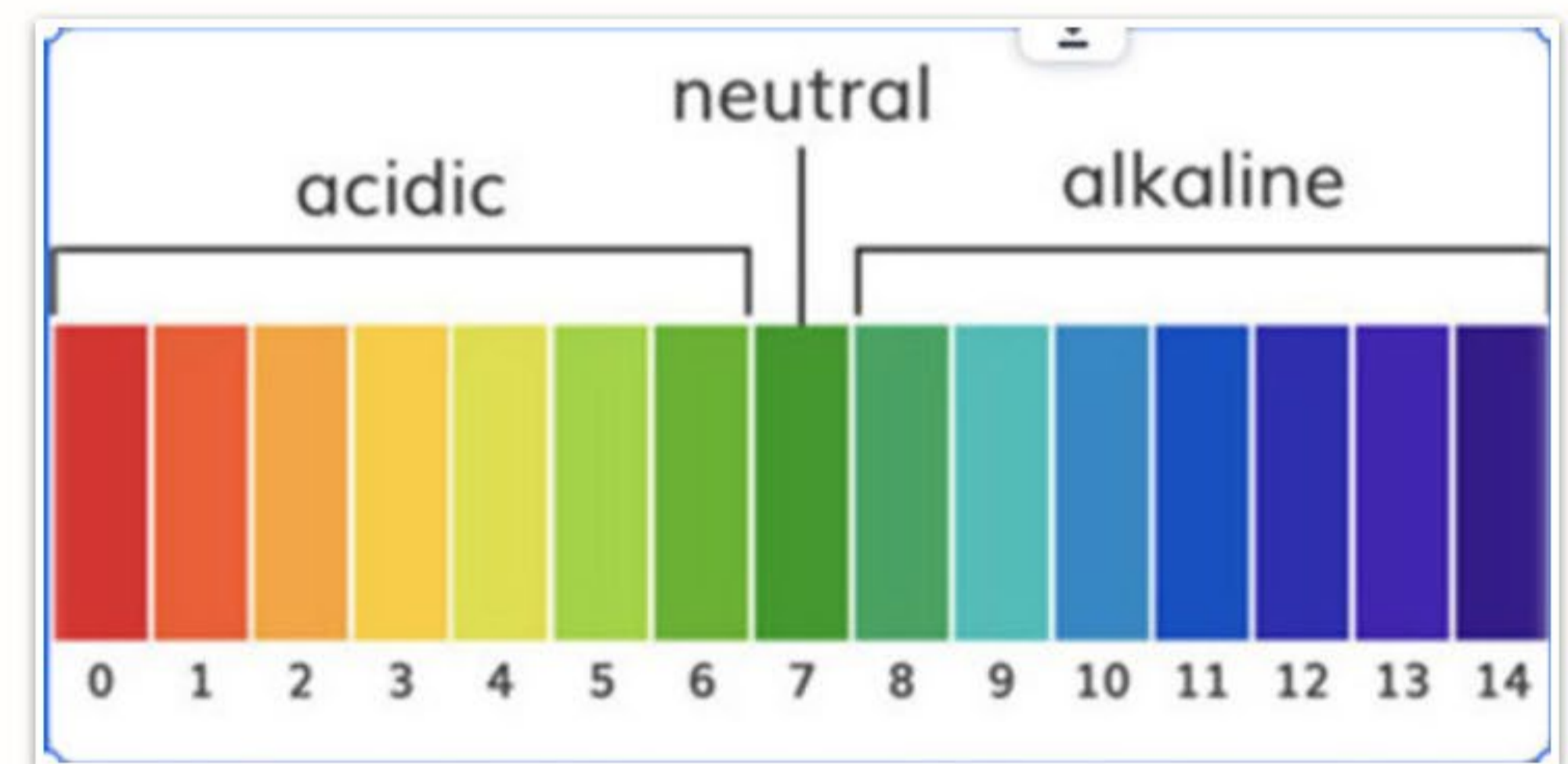
## THE HIDDEN COST OF HARD WATER



Ground water contains a large volume of dissolved minerals. Farmers have to regularly replace equipment because of calcium build up in the filters, pumps and lines. This expense could be avoided if they used an atmospheric water generator as their primary source of water.

When hard water is boiled, calcium deposits build up on heating elements inside kettles and boilers, dishwashers and washing machines, reducing their efficiency over time. The dissolved minerals also stick to plastic, glass, ceramics and metals.

An oasis in the desert proves, that life can thrive as long as there is water. The solution to stopping desertification, is to stop pumping water out of the ground. When water levels return to normal, life will return, and when it does, it will create its own micro-climate.



## STRUCTURED WATER

Purity is standards based, not judgement based. The moment any minerals become dissolved in water, the water ceases to be pure water. Consumers have no way of knowing the quality of dissolved minerals in the water they are drinking.

In its purest form, water has absolutely no mineral content whatsoever. Distillation removes the need to test for contaminants because it can remove them all.

Plants absorb  $H_2O$  from the soil and convert it into  $H_3O_2$ . This is the type of water that the cells in the body actually need, and the only type of water that they can actually utilise. Water from fruits and vegetables contains all the minerals you will ever need, in their purest, and most available form.

Plants use solar energy to convert  $H_2O$  into  $H_3O_2$  and while our bodies can also convert water into  $H_3O_2$ , it takes energy to convert anything. Why expend energy converting water into  $H_3O_2$  when the plants have already done it?

## WHAT IS THE PUREST WATER ON THE PLANET



# HEATING/COOLING

THERMOELECTRIC COOLING USES THE 'Peltier Effect' to create a heat 'flux' at the junction of two different types of materials. A Peltier cooler, is a solid-state unit with no moving parts.



The sun powers both the heating and cooling when this system is in operation.

# SOLAR WATER DISTILLATION

A solar water distiller can turn contaminated water, into pure drinking water, using only the energy from the sun. The output from the distillation still can be collected locally, or it can be piped to another location. The distillation process is completely automatic and requires little maintenance.

A parabolic reflector can be used to heat the front face of the stainless steel column. The heat will transfer passively to the copper coil, but, if an opening is made in the metal, a Fresnel lens can be fitted into the opening. This will focus sunlight directly onto the copper tank and coil, which will ensure the unit is producing distilled water all day long.

Distilled water has a pH of 7 which means it is soft water. A simple circulatory system will produce unlimited amounts of hot and cold distilled water, which can be used for any purpose.

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It's like having a tap that never stops running

When you have experienced life without water, you learn to appreciate the value of every single drop.

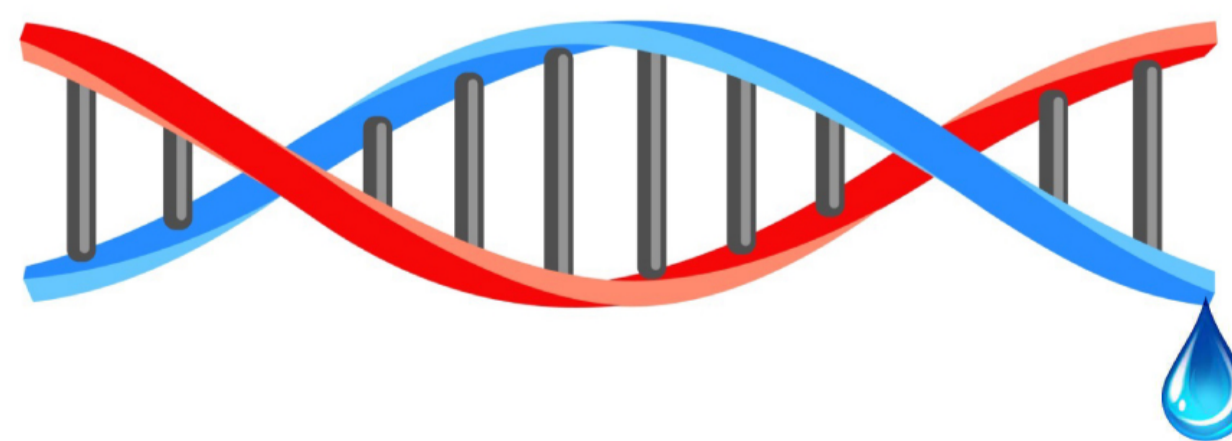
The scientific principals of radiation, conduction and convection, are all utilised in the design of my water generator, the end result, is water. When a student drinks the water, they will embody all the knowledge that went into the designing of it.

I am promoting a new school curriculum aimed at teaching children the truth about how the natural system really works. Download the school curriculum [here](#).



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