20 years ago I wrote "The Untold Truth About Alkaline Balance'.

~Ian Blair Hamilton

Many years ago.. 20 years in fact, I wrote "The Untold Truth About Alkaline Balance'.

In the two decades since, thousands of people have asked for it and benefited from it.

And yet in that time many of the ideas in that book have been well.. debunked.

To me, this isn't a bad thing.

All ideas, concepts and sciences need constant review and renewal through the process of continual exposure to new knowledge.

So this small offering, The Untold Truth About Water Ionizers, comes about because almost everything I wrote about so long ago has been turned upside down.

I'm going to try to keep it simple.

I do, as my son and IT manager always tells me, tend to 'go on a bit too long'.
But the issues I'll discuss are important because many people are still making decisions based on 20-year-old ideas, because they haven't been able to locate better information in the vastness of the world wide web.

It's a strange thing. Endowed, for the first time in human history, with unlimited access to unlimited ideas, the very size of that information base has made it almost as hard as it was pre-internet to find answers. *(Answers without a sales pitch, anyway!)*

OK, OK, I'm already talking too much.

And because we all have shorter attention spans due to the world wide web, I'd better quickly tell you what you'll find here.

1. Alkaline balance and diet; the theory.
2. Alkaline water; the sales pitch.
3. Alkaline water machines: the method.
4. The end of the alkaline water sales pitch.
5. Alkaline water: the real thing.
6. Antioxidant water?
7. The industry, the sellers, the buyers.
8. The knight in shining armour who upended the myths.
9. Molecular hydrogen
10. Molecular hydrogen and water ionizers

- 11. Water ionizers and filtration and molecular hydrogen
  12. The new hydrogen technologies that are replacing water ionizers.

  Let's begin.

  I have already written many articles that relate to each subject above, so to allow you to avoid the traps that so many people have fallen into over the last 20 years, I'll give you links to those articles as well as my up to date information so you'll be capable of making an empowered decision about you and your family's health.

1. Alkaline Balance and Diet; The Theory ~ *and the Reality*

It seemed simple.. (I *like* simple).

- We become too acidic because we eat too many acidic or acid-creating foods.
- To counter this, we need to eat more alkaline foods and try to limit the acid-making foods.
- We are also too acidic because we live in such a stressful environment, and stress creates acidity.
- We are also acidic because the wastes of an acid-fighting metabolism are acids.
- We are also acidic because many of us are in a permanently inflamed state. And inflammation causes acidity.

  To counter acidity we *(according to the many acid/alkaline charts sold on the net)* need to eat 80% alkali-containing foods and 20% acid-containing foods.

Simple, right?

Our next step in our alkaline journey is to consult the charts. We created our own many years ago and I still think it's the best one around, based on Dr Susan Brown's research.

What this usually means is becoming vegetarian, because all the proponents of an alkaline diet say meat is perhaps the worst acidifier.

And so we went vegetarian. I had been vegetarian since around 1970, so it wasn't really very hard to do.

The one result of this was that neither Cassie nor I had a cold or influenza for the last 21 years.

Can I prove that it was the diet, or the water?

No. But it's still pretty spectacular.

However.. It's not that simple. Cassie continued to suffer for ongoing digestion issues.

Yes, she is a ‘sensitive’ but we had expected a less ‘acidic’ diet’ to help. It didn’t.

And we should also add that we didn’t just ‘go alkaline’ in our food. We began to drink ‘alkaline’ ionized water from our own water ionizer.

What’s the problem? There are two main ones.

a) Is it really alkaline?
Let’s talk about bananas, repetitively described as ideal alkaline foods because they contain potassium. *(as do many other foods, especially fruits)*. The charts tell us to substitute these alkali rich foods for more acidic foods.. completely ignoring the elephant in the room..

The bananas, and oranges, and many other luscious fruits, do have small amounts of alkalis, but they also have massive amounts of acid-forming sugars, usually fructose.

And unlike our paleo ancestors, we eat a LOT of fruit!

In fact one of the WORST examples of our excess acid-forming fruit intake is the modern day habit of a fruit smoothie.

We *NEVER* ate that much sugar in one sitting.

We shared fruits with our tribe when it was seasonally available.. And it certainly wasn’t anything like the size or sweetness of the engineered fruits we now get from the local supermarket.

b) Most vegetarians are what I’ve heard called ‘lazy vegetarians’, meaning they don’t adhere closely to the foods that by their nature, contribute little or nothing to their carbohydrate loading. One prime example of a ‘lazy vegetarian’ is the one who eats bread. Yes, it might be ‘stone-ground, wholemeal, organic.’.

But it’s still wheat.. And wheat is a serious acidifier.

What I’ve noticed is that many vegetarians (and ordinary diet people) have massive blind spots.

Their brains seem to go offline when their stomach asks for its next ‘hit’.
They have a stack of ‘righteous’ foods in the larder.. but what actually passes into their mouth is unbalanced and fed by this blindness, which Dr William McBride, author of *Wheat Belly*, described as an addiction.

And if you get the chance to view many people’s actual diet - not the one they *say* they follow.. It does look that way!

Summarizing, if you can follow the basic 80/20 rule and stay away from the foods ‘on the list’ that really shouldn’t be there, if you can really honestly monitor what you eat every day, I

certainly believe that the alkaline diet is useful, because it is still fundamental to our new balance when we no longer live in harmony with nature.

2. Alkaline Water; The Sales Pitch.

Back in 2000 when we began, the whole alkaline concept was new. There were no products on shelves that promised a balanced alkaline body, and the alkaline waters available didn't even say so on thor labels. For better or worse, I have to take responsibility in some part for opening up the world to the benefits of an alkaline-oriented body balance.

So.. we began supplying the Jupiter water ionizer, made in South Korea, in 2000. WE 'debuted' alkaline theory in Australia.

I think it was about 2002 0r 2003 when I began hearing from our US dealer about a rash of Asian people inquiring about our product of the time, the water ionizer.

David, our distributor at that time said that they seemed to all have the same story: that there was a Japanese water ionizer now available in the USA that would make everyone insanely rich.

The callers were just checking in with David to compare their story to ours. The product was sold by a company called Enagic (™), and called Kangen water (™).

It was, of course, MLM, and it was expensive, but as always with MLM schemes, people paid more than they needed to, on the salesperson's promise of 'passive income'. So it wasn't hard to see that what they were actually selling was a sales business, using their water ionizer as the 'bait'.

The product was fundamentally the same as the Korean model we had been selling for a couple of years. Enagic™ had, it appears, bought a controlling interest in a Japanese ionizer manufacturer called Sanastec, and applied their MLM system to the product.

Our 'sales pitch' we gave to people was that the alkaline water produced by our electrolysis machine helped counter the excessive acid influence our modern diet and lifestyle exerted on our long term health. We were very successful because in the beginning, we began to receive amazing feedback from users of immediate health changes for the better.

We never promised any MLM-style 'residual income'.

The only difference between what we were saying and what Enagic™ was saying was, in Enagic's™ case, all of the above PLUS you can make money selling their high price ionizer.

Today I think we can say that although water ionizers have gone through a dozen new models, they really haven't changed in basic design. And it's important to understand that this 'design criteria' never included the production of infused molecular hydrogen. In fact some companies, concerned that the H2 created as a byproduct of electrolysis, actively

sought to limit its production, fearing explosion.

It's probably an example of the relatively unscientific or un-therapeutic view these makers had of their product, especially when, as the years passed, it was revealed that H2 was what gave the benefits, far, far more than the 'alkaline' water', which wasn't true alkaline water anyway.

But more of this later.

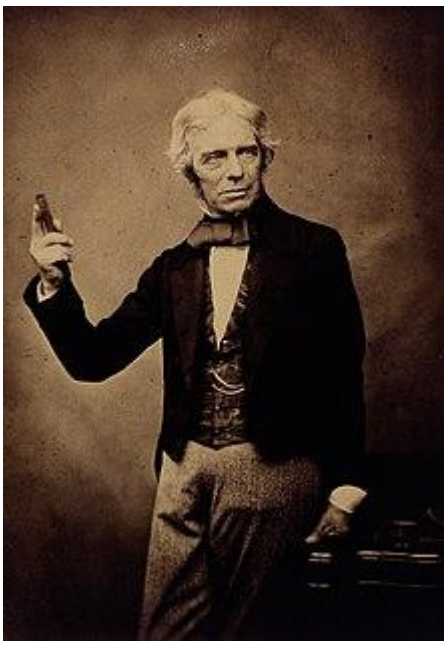
What we have seen is that the nature of Enagic's ™ sales plan changed the industry. They sold far more than anyone else not because of any particularly superior feature or function, but because they enrolled some 'heavy hitter' salespeople early in their marketing, who, in turn sold truckloads on the basis of health AND money.

Later on I'll share how we realised the actual value- or lack of value - of electrolysed 'alkaline water'.

3. Alkaline Water Machines: The Method.

The principle of the electrochemical decomposition of water in an electrolysis cell has already been known for more than 230 years. It's rather significant to remember, as you read this extract, that it was originally used for H2 production.. but the modern vendors completely turned their back on hydrogen.

Perhaps it was a marketing decision. Who knows?



A Quick History

The word "electrolysis" was introduced by Michael Faraday in the 19th century, on the suggestion of the Rev. William Whewell, using the Greek words ἤλεκτρον [ɛ̌ːlektron] "amber", which since the 17th century was associated with electrical phenomena, and *λύσις* [lýsis] meaning "dissolution".

Nevertheless, electrolysis, as a tool to study chemical reactions and obtain pure elements, precedes the coinage of the term and formal description by Faraday.

The first generation of hydrogen by electricity happened as early as 1789 by van Troostwijk and Deiman using an electrostatic generator as the direct current source.

(Hopefully they weren't smoking at the time!)

Shortly after Volta invented the voltaic pile in 1800, Carlisle and Nicholson used such a device to decompose water into hydrogen and oxygen. In the same year, Ritter performed comparable experiments in Jena, Germany. Moreover, Cruickshank used a voltaic pile for the electrochemical decomposition of NaCl to hydrogen and chlorine at the beginning of the 19th century.

Nevertheless, it took decades before the processes were used in the first technical applications. Around 1890 Charles Renard constructed a water electrolysis unit to generate hydrogen for French military airships. It is estimated that around 1900 more than 400 industrial water electrolyzers were in operation worldwide and large-scale deployment of the chlor-alkali process started.

Later, different types of commercial water electrolyzers were developed in the 20th century to generate hydrogen in order to produce ammonia fertilizers based on low-cost hydroelectricity.

As the 20th century progressed, the more cost-effective production of hydrogen by steam reforming of methane increasingly replaced water electrolysis, and by the end of the 20th century, the process was only used in niche applications.

Given how our water ionizers are sold (alkaline water) it's interesting to note **Encyclopaedia Brittanica**'s description of its uses.

"Electrolysis is used extensively **in metallurgical processes**, such as in extraction (electrowinning) or purification (electrorefining) of metals from ores or compounds and in deposition of metals from solution (electroplating). ... Hydrogen and oxygen are produced by the electrolysis of water.

(Note: They don't even mention alkaline water!)

They continue:

- "Electrolysis is used in the extraction of metals from their ores. …
- It is used for refining certain metals such as copper and zinc.
- Electrolysis is used for the manufacture of chlorine.
- Electrolysis is used for electroplating many things we use every day."

Electrolysis and Hair removal??

It only took about fifty more years for its first 'therapeutic' use to be discovered. In 1875 electrolysis was introduced to the medical profession by ophthalmologist

Dr. Charles E. Michel when he published his record of successful permanent hair removal of ingrown eyelashes. He was also the first to encourage its use to remove superfluous hair on other parts of the body.

Thirty years later (1916) it became known as a method of addressing excessive hair growth.

Electrolysis: What is it?

(I'll use Wikipedia's definition here because I think it will be better than mine.)

Electrolysis is the passing of a direct electric current through an electrolyte producing chemical reactions at the electrodes and decomposition of the materials.

The main components required to achieve electrolysis are an electrolyte, electrodes, and an external power source. A partition (e.g. an ion-exchange membrane or a salt bridge) is optional to keep the products from diffusing to the vicinity of the opposite electrode.

The electrolyte is a chemical substance which contains free ions and carries electric current (e.g. an ion-conducting polymer, solution, or a ionic liquid compound). If the ions are not mobile, as in most solid salts, then electrolysis cannot occur. A liquid electrolyte is produced by:

- Solvation or reaction of an ionic compound with a solvent (such as water) to produce mobile ions
- An ionic compound melted by heating

(Ian: Note: Electrolysis cannot occur with pure water.)

The electrodes are immersed, separated by a distance such that a current flows between them through the electrolyte and are connected to the power source which completes the electrical circuit. A direct current supplied by the power source drives the reaction causing ions in the electrolyte to be attracted toward the respective oppositely charged electrode.

Electrodes of metal, graphite and semiconductor material are widely used. Choice of suitable electrode depends on chemical reactivity between the electrode and electrolyte and manufacturing cost.

Historically, when non-reactive anodes were desired for electrolysis, graphite (called plumbago in Faraday's time) or platinum were chosen. They were found to be some of the least reactive materials for anodes. Platinum erodes very slowly compared to other materials, and graphite crumbles and can produce carbon dioxide in aqueous

solutions but otherwise does not participate in the reaction. Cathodes may be made of the same material, or they may be made from a more reactive one since anode wear is greater due to oxidation at the anode.

The Process of Electrolysis

The key process of electrolysis is the interchange of atoms and ions by the removal or addition of electrons due to the applied current. The desired products of electrolysis are often in a different physical state from the electrolyte and can be removed by physical processes (e.g. by collecting gas above an electrode or precipitating a product out of the electrolyte).

The quantity of the products is proportional to the current, and when two or more electrolytic cells are connected in series to the same power source, the products produced in the cells are proportional to their equivalent weight. These are known as Faraday's laws of electrolysis.

Each electrode attracts ions that are of the opposite charge. Positively charged ions (cations) move towards the electron-providing (negative) cathode. Negatively charged ions (anions) move towards the electron-extracting (positive) anode. In this process electrons are effectively introduced at the cathode as a reactant and removed at the anode as a product. In chemistry, the loss of electrons is called oxidation, while electron gain is called reduction.

When neutral atoms or molecules, such as those on the surface of an electrode, gain or lose electrons they become ions and may dissolve in the electrolyte and react with other ions.

When ions gain or lose electrons and become neutral, they will form compounds that separate from the electrolyte. Positive metal ions like Cu^{2+} deposit onto the cathode in a layer. The terms for this are electroplating, electrowinning, and electrorefining.

When an ion gains or loses electrons without becoming neutral, its electronic charge is altered in the process.

For example, the electrolysis of brine produces hydrogen and chlorine gases which bubble from the electrolyte and are collected. The initial overall reaction is thus:[18]

$$2\ NaCl + 2\ H_2O \rightarrow 2\ NaOH + H_2 + Cl_2$$

The reaction at the anode results in chlorine gas from chlorine ions:

$$2\ Cl^- \rightarrow Cl_2 + 2\ e^-$$

The reaction at the cathode results in hydrogen gas and hydroxide ions:

$$2\ H_2O + 2\ e^- \rightarrow H_2 + 2\ OH^-$$

Without a partition between the electrodes, the OH^- ions produced at the cathode are free to diffuse throughout the electrolyte to the anode. As the electrolyte becomes more basic due to the production of OH^-, less Cl_2 emerges from the solution as it begins to react with the hydroxide producing hypochlorite at the anode:

$$Cl_2 + 2\ NaOH \rightarrow NaCl + NaClO + H_2O$$

The more opportunity the Cl_2 has to interact with NaOH in the solution, the less Cl_2 emerges at the surface of the solution and the faster the production of hypochlorite progresses. This depends on factors such as solution temperature, the amount of time the Cl_2 molecule is in contact with the solution, and concentration of NaOH.

Likewise, as hypochlorite increases in concentration, chlorates are produced from them:

$$3\ NaClO \rightarrow NaClO_3 + 2\ NaCl$$

Other reactions occur, such as the self-ionization of water and the decomposition of hypochlorite at the cathode, the rate of the latter depends on factors such as diffusion and the surface area of the cathode in contact with the electrolyte.[19]

My ‘Layman’s version’.

Water enters the electrolyser.
It may or may not pass through a filter.
After the filter, it enters an electrolysis chamber.
Electricity passes through the water causing acidic elements in the water to pass out one side of the chamber, and alkaline elements out the other.
The alkaline water is consumed.
The acid water goes down the drain.

4. The End of the Alkaline Water Sales’Pitch’.

The sales pitch you have most likely heard would have come from an MLM company. That’s because the MLM system, where everyone who buys one tries to sell one to all of their friends, is very effective in selling the story.

It’s successful because of the rewards: at least a thousand dollars to sell one.

The ‘pitch’ has two definite separate parts.

1. The benefits of the water
2. The benefits of selling people the machine.

Our observation on this approach, after observing it in action since around 2003, is that it is actually offering a business ‘opportunity’ more than a health benefit. And the attractiveness of the business opportunity often outweighed the exorbitant price necessitated by all MLM systems.(Currently up to $8000)

The other fundamental flaw in the sales pitch was the claim that the alkaline water produced by the machines was also ‘micro-clustered,’ antioxidant, and pure.

1. Microclustered Water:

The theory propagated about micro-clustering was that the clusters of molecules in the water were smaller and therefore could penetrate the cells better. To better explain this I will quote from Tyler LeBaron, principal of the Molecular Hydrogen Institute.

"*Generally, the claim is that tap water contains water clusters of 15 or more; ionized water is electrically restructured to have smaller cluster size of only 3-5 H2O molecules per cluster. This makes the water have faster absorption and because of its smaller size, it can more easily enter the cells and increase cellular hydration.*[41] *Numerous benefits are ascribed to microclustering, even that it is the most important property of ionized water.*

THE SILVER FLEECE AWARD

Microclustering of water actually won The Silver Fleece Award[43] *for "Anti-Aging Quackery" for being the product "with the most ridiculous, outrageous, scientifically unsupported or exaggerated assertions about ageing or age-related diseases."*[44] *This is a big reason why many ridicule the concept of ionized water.*

THE FACTS

Unfortunately, no valid scientific evidence exists either for its occurrence or for its benefits. I have done an exhaustive search for the past five years in many databases including: PubMed, HighWire, SciFinder, Web of Science, Scopus, etc. in search of evidence to support either its existence or its benefits, but scientific research refutes these claims.

In fact, one scientific article, by pro-ionized water researchers, specifically set out to evaluate the claims of microclustering in these products. Their results show that there was absolutely no difference between the claimed "microclustered water" and the controls. In the paper the authors conclude: "The claims in the advertisements of the manufacturers concerning the cluster size of H_2O molecules have not been confirmed by the results of our experiments."

In reality, adding really small pieces (i.e. micro-pieces) of silica to water, results in "microclusters" of water.

If you added just one ion (like calcium) to the water, the water molecules would also surround it, but this is much smaller then a micrometer. It's on the nano scale, so the resulting cluster would be a nano cluster.

If you add something the size of a millimeter to water, then you would get a water "millicluster".

The use of microclustered minerals has been very common and refers to mineral colloids.

This simple idea of "hydration spheres" or "solvation spheres"rapidly grew to the idea that it was the microcluster itself that exerted therapeutic benefits ~ not the ion (or solute) it contained. Eventually, the ions (or solute) was abandoned altogether and marketers just propagated the myth that water microclusters are healthy and increase hydration, nutrient delivery, etc.

It wasn't until recently that molecular hydrogen was found to be the primary benefit of ionized water, marketers held on to the idea of microclustering to help explain the therapeutic benefits of the water.

2. Antioxidant Water

This ‘convenient’ sales story came about because water from an electric water ionizer has a negative electrical charge, giving it the title of ‘Reduced’ Water.

You’ll hear salespeople talk about negative ORP, saying this proves it is an anti-oxidant because positive ORP is an oxidant.

Let’s unpack what ORP means…

Oxidation (or) Reduction Potential

Oxidation means the water has a positive electrical charge.

If you were to pour this water on bare steel, it would cause the steel to rust faster than neutral water. Rust is oxidation. So the water would have “Oxidation or reduction Potential”.

Reducing is the opposite.

It donates electrons to what it comes into contact with.

Potential is the important word in this term. It means that the water may - or may not - have the potential to oxidise or donate electrons. It does NOT say it is an antioxidant.

However this hasn’t prevented it being used as a powerful lever in the sales pitch. You’ll hear sales people claiming you are getting ‘antioxidant water’.

The big breakthrough came some years ago with the discovery of what actually caused an antioxidant effect. It was *(thanks to you, Tyler LeBaron)* not alkalinity or ORP. It was infused molecular hydrogen in the water, which was viewed by the big vendors as a potential nuisance to their sales pitch!

Tyler visited Japan’s Nagoya University to work with scientists who, unbeknown to the west, had been studying the therapeutic effects of H2 for over a decade.

So.. if the antioxidant is H2, and it is already a byproduct of electrolysis, what’s the problem?

The problem is that electrolysis machines like the ones sold by the big guys, aren't designed

for H2 production. It could even be said that it was designed not to produce H2!

What has this to do with YOU as a potential user?

1. The ability of a water ionizer to produce constantly therapeutic levels of molecular hydrogen, properly infused in the output water, is limited. Unless the plates within the chamber are kept scrupulously clean, you'll still get high pH water and even high negative ORP water, but no hydrogen. And you won't know that you're getting no hydrogen.

2. The ability to maintain acceptable levels of H2 relates directly to the capability of the water ionizer's prefilter to ensure no detritus accumulates on the plates. If detritus does accumulate, H2 production drops.

3. The process of electrolysis means that detritus is attracted to the plates. And the quality of the prefilter varies greatly. No prefilter we have seen on any water ionizer has the ability to remove all detritus.

4. Although the prefilter may remove some detritus / sediment, the user cannot tell if it has affected the H2 output. Advice from vendors is to perform regular *(every 2 weeks)* cleansing of the unit. This is a routine where water flow in the unit is reversed. Acid water flushes the system, and the magnetic fields of the plates are reversed.

Twenty minutes of tap water every two weeks d*own the drain*. And even if you perform this ritual, unless you have done it from the beginning, it may not work.

The reports you may have seen of 'miraculous' health changes when people first use their machines come about because they have spotless plates and a new filter.

We have many reports of people who, once they were able to test H2 output, stopped using their machine.

If you still want to buy one after reading this, we suggest going to Facebook Marketplace where you'll find any number of as-new machines for sale at half price or less.

If you want a new one, insist on test results on the filter and on the H2 output from an independent reputable laboratory.

5. Alkaline Water: the Real Thing.

Hopefully what you've read so far demonstrates to you that drinking water from an electric water ionizer isn't necessarily alkaline.

The alkalinity of the output 'alkaline' water is totally dependent upon the alkalinity of the incoming water.

If you have low levels of alkaline minerals in your input water, you'll have low output alkalinity. Generally speaking, the ionizer doubles the alkalinity by separating out half of the input water.

One would consider that the technology would be advanced enough to gauge the alkalinity of the input water but no, it's been the same technology forever. It simply attracts acid ions to the acid water outlet, and alkaline ions to the 'alkaline' outlet.

Conversely and more serious in effect, if you hook up a water ionizer to input water that is already alkaline, the output pH may be so strong as to cause diarrhea and gastric problems.

To make it very clear: a water ionizer increases the percentage of alkaline minerals in your output water when compared to your input water by **removing half of the water:** the acid water. So if you have 3mg of calcium in one litre of your input water, you'll have 3 mg of alkaline minerals in 500ml of output 'alkaline' water.

The Real Thing

What also needs to be mentioned is the fact that electrolysis of water causes the pH level in the water to 'unlink' with the alkalinity of the water. The pH reading may be pH 9.5 but the actual alkaline mineral levels of the water may be much lower. As mentioned earlier, this accounts for the state of 'unbuffered' output water; water with less ability to neutralise acids.

Artificially 'bumped' by electricity.

6. The industry, the Sellers, the Buyers.

It's helpful, when you are considering buying a technology you have no experience with, to receive an overview of the industry and where it's heading.
How many of us bought CD's when the industry was moving to I-Pods?
How many of us bought an I-Pod or a digital camera only to discover our cellphones were better?

I'll try to give you a concise summary of where the industry is headed today (March 2022)

We can divide the industry into product sectors.

1. Water ionizers
2. PEM H2 systems
3. Natural H2 water filters
4. H2 inhalers
5. Other H2 devices
6. H2 tablets

1. Water Ionizers.

Three companies dominate the sales of electric water ionizers in the West. These are Enagic, AlkaViva and Life Ionizers.

Things to watch for:

Technology.
The Korean machines sold by AlkaVivaTM and Life Ionizers are more advanced than the Japanese EnagicTM KangenTM models. They have a far better auto cleanse system that assists to maintain good H2 levels, they have better filtration, and some have even incorporated PEM technology in their top-end models.

They sell prices far below the Enagic TM systems.

It could be said that they are pricing their models to benefit from the extreme price of the EnagicTM units. Both AlkaViva and Life Ionizers have diversified to include natural and PEM products in their range, acknowledging that the technology has advanced beyond the wasteful electrolysis method.

All three companies have been operating for over a decade and appear solvent.

2. PEM H2 Water systems.

PEM technology is relatively new but has already seized a large part of the emerging market, particularly with portable H2 producing water bottles that produce higher H2 levels than most water ionizers for a fraction of the price.

Here's a link that explains how PEM (Proton Exchange Membrane) works.

- PEM benchtop machines deliver consistent H2 levels but usually at a lower flow rate than water ionizers.
- They do not alkalize the water.
- Filtration capability varies by manufacturer.
- PEM systems byproduct is ozone water, used for cleaning.
- PEM technology now extends to inhalers, cosmetic sprays, portable bottles, reverse osmosis systems and more.

3. Natural Water Ionizers

We have to declare an interest here.
We introduced the natural water ionizer and filter to the market almost a decade ago and today it accounts for around 90% of our sales. The UltraStream uses special hydrogen infusing media incorporated in a water filter to provide ultrapure hydrogen-rich alkaline water.

Unlike electric systems, it wastes no water in doing so and needs no regular cleanse regime. Just replace the filter once a year and you have an 'as new' water ionizer.

Its success comes mainly from people who realised they could have all the advantages of the electric systems at a price around 1/10th of what they would pay for an electric system.

4. H2 Inhalers

These devices supply hydrogen via inhalation rather than via water. The general view is that water has advantages in cases where you want to reach the organs and the circulatory system, while inhalers are better for the lungs. However the science of this is still in its infancy.

There are basically two types of inhalers.

a) Brown's gas units. (HHO*) These consist of a box around the size of a desktop computer which supplies what is known as Brown's gas.

Brown's gas is a mixture of the elements of water in the same proportions as water: **hydrogen and oxygen mixed at a 2:1 ratio**. An electric current is used to separate and disassociate the molecules of the water, allowing the hydrogen and oxygen to act independently of each other.

*HHO is a popular way of writing OxyHydrogen - a mixture of hydrogen and oxygen

gases, usually in a 2:1 ratio. Thus, HHO = **Hydrogen-Hydrogen-Oxygen**. Since the oxygen and hydrogen are in mixed gas mode and not bonded, it is not H2O (water).

b) PEM units as already described above.

5. Other H_2 devices

The molecular hydrogen scene is very much in its infancy and new applications and devices are appearing every month. These include:

- Devices to aid agricultural growth
- Devices to atomise hydrogen water for skin application
- Devices to create H_2 in a bath or spa
- H2 tanks for full immersion
- Small portable H_2 water generators

Of these, the most popular is the small portable H2 water generator.

Using PEM technology, these devices resemble a portable water bottle.

In the base of the bottle is a PEM unit that creates hydrogen-rich water in less than 5 minutes. Its popularity is due to its simplicity of operation, and its ability to create H2 water of equal or better concentration than a water ionizer hundreds of times the price.

6. Hydrogen Tablets

These tablets appeared first around 6 years ago.
Drop a tablet in a glass of water and within a couple of minutes you have high concentration hydrogen-rich water.

One company dominates this sector because of the ability of its product to deliver much higher concentrations of hydrogen than its competitors.

The knight in shining armour who upended the water ionizer myths.

8. Molecular hydrogen
9. Molecular hydrogen and water ionizers
10. Water ionizers and filtration and molecular hydrogen
11. The new hydrogen technologies that are replacing water ionizers.

(We'll explore each of these points later.)

Every industry has its knight in shining armour.

Electric cars have Elon Musk.
Recorded music lovers have Steve Jobs.
Molecular hydrogen water has Tyler LeBaron.

This industry has Tyler LeBaron.

At age 26 young Tyler, an undergrad student at Brigham Young University, listened to a sales pitch from an Enagic distributor. Like many people, he liked the idea of 'residual income' and he also liked the idea of antioxidant, micro clustered alkaline water. So he took the leap and bought an SD501 Enagic water ionizer.

Tyler has a very inquiring mind, so it wasn't long before he began to look for the science behind the claims that had convinced him to invest. Being a biochemist meant that he was at ease around scientific journals, which very quickly revealed to him that most of what he had been sold on.. was without scientific support.

Again, his scientific mind gave him the ability to search worldwide to find the truth about 'alkaline ionized, micro clustered water. He quickly found the truth in japan, at Nagoya University where the subject had been studied for over a decade and from where the first internationally published article on molecular hydrogen infused water had been published.

His next step in self-education was bold. He contacted the department at Nagoya University and invited himself to visit. The scientists there were surprised: no Western scientist had ever bothered talking to them before. He was very welcome.

After his 'self-education' with the help of the Nagoya team, Tyler returned to America with a big message but at that time, a small voice.

Hi 'big' message' was that the alkalinity of the water, the microclustering of the water, the antioxidant 'ORP' of the water.. Ahd little to do with the beneficial effects the water was reported to give.

The real benefit.. perhaps the only benefit.. Was the ability of the water to receive infused molecules of hydrogen, and to be a carrier of that H2 into the body.

Perhaps not surprisingly. Tyler's message was not received well. The most successful water ionizer vendor hs honed an enticing sales story and replicated it for use by every buyer of their machine, in the form of a multilevel marketing story.

To change their whole sales pitch would have meant what we think would be a marketing disaster, so for some years they basically ignored him. And they ignored the fact that when their machines were working to peak performance, they did produce molecular hydrogen.

However, their sales people were hearing Tyler's message. There are still videos on youtube showing owners holding a lighter to the outlet stream, illustrating the hydrogen burning as it came out with the water.