WATERGAS NU

Message to COP21

Water is a source of energy

WATER: Energy source to power the world

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1875 A French science-fiction author predicts that water will be the energy source in use, after coal and oil is depleted. He guessed that it will take at least two hunderd years before steamers would navigate the seas on water – as fuel that is. Because by that time electricity would be cheaper and well manageable.

2015 The French are hosting the COP21. Leaders of the nations convene. Act now to stop climate change! Countries are committed to cooperate.

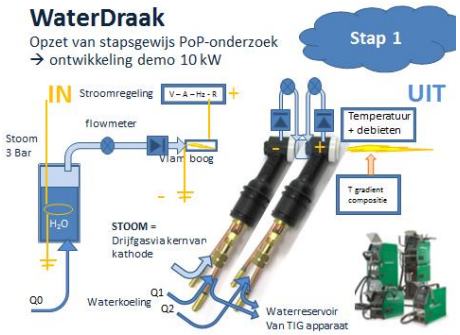
2025 The science-fiction author, Jule Verne, is proven both correct and inaccurate in his prediction. Water is now widely used as source of heat-energy. Sun provides for electricity. CO2 is converted into methane to produce all kinds of base materials. The world did not wait till 2075. The Innovation Fund of Bill, Jack, Mark, Richard and other billionaires succeeded in the rapid deployment of water energy.

Basics: Watergas is 'gas of water'.
The Watergas.NU Foundation aims to accellerate the introduction of watergas (or 'HHO'). Problem is that many phenomena of HHO-Watergas can not be explained with standard physics. Too little scientific research is devoted to watergas. In the USA the 'normal' HHO is often added to internal-combustion engines ('gas guzzlers') to save fuel and emit less soot and CO_2. In China HHO is well used for welding. But watergas is still rather unknown. Watergas and hydrogen are mostly applied as catalyst or energy carrier.
In this message we prove that water is a source of energy.

No CO_2 emissions!

Water-energy based on resonance
Resonance technology is the basis of water-energy. The water molecule is shaken apart. At room temperature we know the normal 'HHO', produced with resonant-electrolysis (Meijers et al.) and radiolyses (Kanzius and Ohmasa). This watergas makes existing cars cleaner and more efficient – if only the industry would adopt it. Another way to harvest water energy is by thermolysis and plasmolysis. Extreme heat vibrates the water molecule to fall apart. We can prove that water is a source of energy – using standard physics.. We hope that this proof will induce more scientific- and industrial interest in the 'normal' watergas as well.

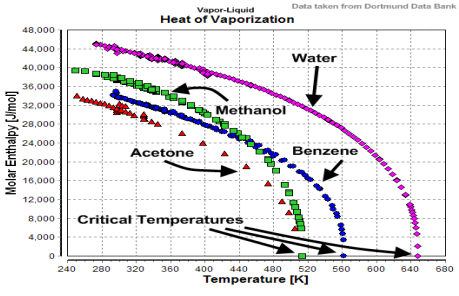
Mini-plasmatron melts Tungsten (3500 oC)



Plasmatron set-up as applied in model calculation

Heating

Water: 4,9 kJ/kg/^{o}K
Energy to break vapor tension
At 100 ^{o}C: 2250 kJ/kg
At 300 ^{o}C: 1390 kJ/kg (56%)
Steam
to 3000 ^{o}C: 1,41 kJ/kg/^{o}K



Plasmolysis offers scientific proof of water energy

The device that is applied in this water-energy technology is the plasmatron. Research on hydrogen production in plasmatrons is executed by Hrabovsky[1], Kezelis et al.[2] and Boudesocque et al[3]. Companies like Air Products, and Pyrogenesis apply plasmatrons for hazardous waste gasification.
In the picture a Plazarium mini-plasmatron is filled with a small amount of water. The torch melts Tungsten at about 3500 ^{o}C.
The plasmatron is much like a plasma welding torch. With a plasma welder you create an arc between the metal work piece and the torch. First a small electron arc is made in the torch itself. A propellant gas blows the arc to the outside of the nozzle. The arc then jumps over to the work piece to be welded. The current is increased and the arc melts the metal. The propellant is normally an inert gas, such as argon.

Step 1: boil water

The mini-plasmatron uses steam as the propellant to blow-out the arc. We consume only half a cup of water (90 ml) per hour.
Imagine two welding torches. Between the two torches a small process chamber is created. The water is boiled in a pressure cooker at about 300 ^{o}C. At this temperature it costs less energy to boil the water (see graph bottom left[4]). The high-pressure steam enters through the rear torch. Initially the torch is powered with 8 ampère of electrons with a voltage of 220 Volt (1,1 kWh of energy enters into the process after internal heat losses in the device). The current of electrons through the torch creates heat. We consume 60 Watt of electricity per hour (0.06 kWh) for boiling and evaporation.

Step 2: heating the steam

Then the steam enters into the small chamber with the plasma arc. The arc is in fact a very hot plasma. So the steam is further heated to about 3000 ^{o}C. This costs energy of about 100 Watt per hour (0.10 kWh).

[1] Hrabovsky, The Open Plasma Physics Journal, 2009, Volume 2.
[2] Kezelis et al., Water steam plasma for hazardous waste treatment, Plasma 99.
[3] Boudesocques et al. Hydrogen production by thermal water splitting using thermal plasma, WHEC 16, 2006
[4] Source: Dortmund Data Bank

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Input of electricity:

1,32 kWh electricty and

15% power loss to device

After plasma formation
voltage falls to about 10%

1 liter of water =
55,6 Mol H_2O

Water consumption 90 ml
Heating energy consumption

-0,03 $kWh_{water\ (1)}$

-0,03 $kWh_{evap\ (1)}$

-0,10 $kWh_{steam\ (2)}$

(source: Wikipedia)

Bonding Energy of H_2O	kJ/mol
Bonding energy of H-OH	493,4
Bonding energy of O-H bond	424,4
Total	917,8

Binding energy
917,8 kJ/Mol
1 kJ = 0,000278 kWh
14,6 kWh/liter of water

Binding energy of 90 ml water

1,25 kWh watergas (1)

The energy bill for 90 ml water:

Electricity	**+ 0,11 kWh**
Heating	**-- 0,16 kWh**
Binding energy	**+ 1,25 kWh**
Total	**+ 1,20 kWh**

Step 3: steam falls apart into H and O
Steam starts to fall apart into hydrogen (H) and oxygen (O) above circa 675 ^oC. At 3000 ^oC all steam is dissociated. The system.must be cooled. Hrabovsly and the other researchers all apply water cooling. Cooling water is partly fed into the process chamber. We will see in the end that cooling water will add to the energy output, because water becomes a source of energy. So we don't need to take cooling into account for this proof – Keep it as simple as possible!.

Step 4: H and O fall apart into Plasma
At this temperature hydrogen and oxygen start to further desintegrate into plasma state of matter. Plasma is a charged state of matter consisting of a soup of electrons, protons and atomic nuclei. So the resistance to the current falls. Consequently the voltage (tension) to push the flow of electrons (amperage) falls as well. The display of the mini-plasmatron of Plazarium indeed shows that after plasma formation, the voltage falls to about 10% of the initial voltage. The flow of electrons (the amperage) remains constant. Electric energy input falls to 110 Watt per hour (0.11 kWh).

Step 5: Water Plasma returns into H_2O
The steam plasma presses the arc out of the chamber. Once outside the nozzle the energy of the torch becomes available. This energy is the same as the energy it would take to pull the water molecule apart. We neglect the bonding energy of first pulling apart the two H-atoms (only about 3% of the total). First one Hydrogen atom is pulled off the H_2O. Then the second H-atom is pulled off. This binding energy is returned when two H-atoms and one O-atom recombine into water (H_2O).
After translating kilojoules and moles to kiloWatthours and liters we learn that one liter of water holds 14,6 kiloWatthour (kWh) of energy.

So our half-cup of water yields 1,20 kWh of energy! That is about one third of the daily energy consumption of an (world)average household..

Water becomes a source of energy!.

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Paradigm shift from Carbon to Water
We are aware that this information may have consequences to the interests of small and big companies, in particular in the carbon industry. But is the threat of a great climate change due to increased CO_2 levels not bigger than the interests of particular companies and countries? Some companies already know that water is a source of energy. **Now we all know!** The paradigm shift from carbon to water offers new opportunities – **in all countries**.

Research and development:
There is a lot of research and development work to do! Water can also be split by the other resonance technologies as well. Nano technology enhances resonance technology. We can start up-cycling in stead of re-cycling. Watergas and CO_2 makes methane. We suggest to start with the quick wins:

1) Automotive industry adopts HHO for cleaner engines;
   (short term reduction of 20 to 40% reduction of CO_2)
2) Heating our houses and offices with watergas;
   (currently proto types being tested – replaces natural gas)
3) Steam production to process industry and urban areas;
4) Afterburning off-gasses of existing energy plants and then
5) Methane from CO_2 and HHO ($\rightarrow CH_4 + O_2$)
6) Plasma Gasification of carbon fuels in stead of burning;
7) Cleaning up toxic waste dumps with plasma gasification.

Message to COP21 delegates
The Watergas.NU Foundation supports the message of Bill Gates c.s. with their fund for energy innovation.

1) **Invest early**: Start with high-risk seed investments;
2) **Invest broadly**: Connect a range of approaches;
3) **Invest boldly:** Scaling-up and desemminate rapidly;
4) **Invest wisely**: Combine science, technology and policy;
5) **Invest together**: Combine Private and Public funding.

Committment is a key factor. Cooperation and open-source approach may be another key. Can COP21 formulate rules for open-source IP exchange for water energy technology? Basics of water energy is relatively simple. We need complex electronics to create resonance efficiently. Safety is an important issue. With ‘normal’ HHO for house heating Watergas.NU has seen efficiency factors of more than 40. Let the sun provide electricity and water provide heat.

Let’s all get started! Our goal: 2025 - 50% less fossil fuels

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