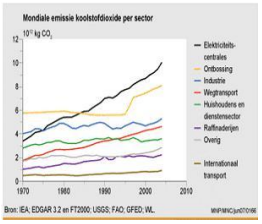
1. On Grips!

We need to make our economy more sustainable. Emission of CO2 has to be reduced. Currently the upward trend has been slowed down! Watergas can and will provide an interesting contribution to further reduce emissions and our dependance upon hydrocarbons in the future.



Watergas technology is an important addition on the whole scope of options for sustainable alternatives to fossil fuel energy supply. Watergas production is a relatively low cost technology.

Basics of watergas technology is rather simple. No extensive infrastructure is required for distribution of this fuel, since it is produced on the spot and on demand. Energy efficiency is quite high. Watergas technology will reduce energy bill to the significantly.

Governments and industry is to play an important role in further development of watergas technology into a professional consumer product. Products must be developed that are both attractive and safe to consumers. The administration is to create a favorable market for the (re-)entry of water-energy into business. Thus, watergas technology can become an important aspect in the creation of a smart grid. With the use of watergas technology consumers can become net producers to a bottom-up grid of Europe.

Our world community will become less dependant upon carbon based energy. Do we enter into the vision of Jules Vernes finally? Let's get on grips!

2. Watergas mission

The mission of Watergas.NU is to promote the technology to get a better and more sustainable society. Watergas will proceed from its pioneer phase into professionalisation.

Watergas.NU aims to open up knowledge on watergas independantly end objectively.

Watergas technology is especially interesting for small and medium enterprises. Eventually big firms will follow suit.

Watergas.NU aims to do research into the field of safety riscs and consumer protection. We intitate projects and provide stimuli. We will not wait and see. We get on grips with innovation of energy supply chains in several sectors of the economy.

Watergas.NU will seek cooperation with similar platforms in and outside of Europe.

Safety is an important aspect. Institutes like the Dutch KEMA, TNO and NEA need to be involved into the introduction of watergas. Watergas.NU will set up a testcentre for watergas devices.

To the public sector Watergas is not only interesting in terms of realising international climate goals. Government agencies can save millions on their own office and facility management. Imagine a reduction of 20% on heating expenditures of governement buildings. How much would it save the taxpayer?

Apart from the admnistration Watergas.NU looks for cooperation with companies that are interested in specific applications of watergas. The best way to innovate is to take action with pilot projects.

3. Energy transition and HHO

Watergas.NU aims to provide a contribution to the energy transition that will take place in the coming decade. Within the framework of the Dutch Platform of Energy Transition several topic areas have been determined.

Watergas can contribute to the several topics, around which network organizations have been formed. The supporting agency, the 'IPE' could play an interesting role to support pilot projects at the several platforms.

Platform Sustainable Traffic Management

The first step is a pragmatic one. The application of watergas in existing cars (retrofit). The goals for reduction of emissions can be reached sooner.

Watergas for busses and the transport sector is a first step to support sustainable traffic management. Saving fuel is very interesting to the companies.

Eventually we expect that watergas addition will be adopted in new built vehicles by the factory (OEM).

50 million liters of diesel; Saving 10%; 5 million Euro

Watergas will be applied in shipbuilding, heavy equipment and airspace as well. Emissions in these sectors are still impressive. Saving on fuel is an important item for the companies.

During World War II both English and German tanks were mounted with watergas. Aren't we a bit at war these days as well?

The development of H2-engines by BMW seems tob e just in time. Can Watergas replace H2? Than H2-infrastructure is not needed. Gas tanks neither. Application of watergas in combination with more efficient batteries, seems to be an interesting combination.

Platform New Gas

Although we know watergas already for about 150 years, Watergas is considered a 'new gas'. Can watergas enhance the efficiency of natural gas? What about safety? What about required appliences? Since watergas burns far quicker, we expect that burners have to be adapted.

How to utilize the plasma-characteristic of the watergas torch? The Dutch natural-gas company NAM seems to have excecuted tests with addition of watergas to natural gas. By mixing watergas with Aceton the flame can be tempered, thus becoming useful in heat generating processes.

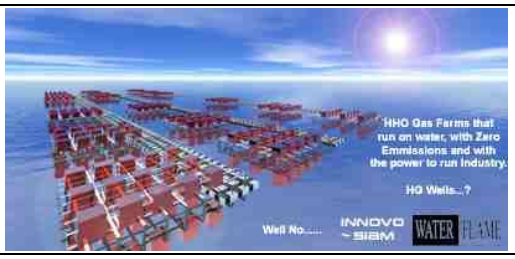
Platform Green Aggregates

Watergas has unsuspected green aspects. A mixture of watergas and carbon exists that is produced at high voltages from several wastematerials (magnegas). The discharge of big urban sewage plants can be utilised fort his purpose. Upon ignition, the emission of CO2 is drastically reduced by about 50% and extra oxygen is produced.

Water can be enhanced by leading watergas through it, is known to increase production of agriculture and animal husbandry. Animals and plants become more healthy.

Platform Sustainable Electricity Supply

Watergas.NU expects that watergas will support the development of electric motors. Watergas can increase the actieradius.



One company has the vision of large –scale watergas dual-fuel electricity plants. Watergas is produced from wind and solar energy and used to get electricity plants cleaner and more efficient. Thus modular watergas-energy plants will produce sustainable energy (using biofuels, magnegas(?)), while CO2 emission is drastically reduced?

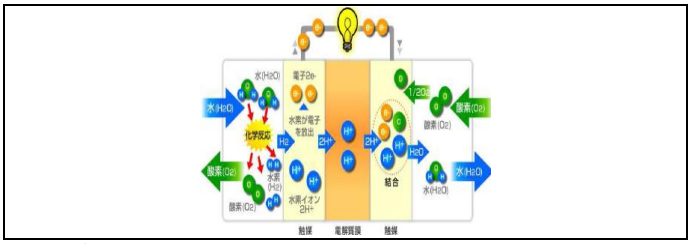
Platform Built Environment

The question whether one can heat a house and provide with energy with watergas depends upon the efficiency of the process of elektrolyses. Heat-Power systems are interesting options. High-efficiency heating units have been developed recently in the Netherlands. Stirling motors inside transfer heat into electricity. These units can be heated by watergas!

Platform Power Train Efficiency

Combination with steam technology is another option. Steam engines lost the race at the beginning of last century, but new developments are coming. Please google on 'HAW-system'.

What will be an optimal power train when using watergas? The Japanese firm Genepax applies fuel cells to supply electricity to its 100% watergas car.

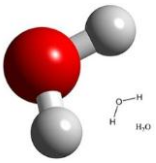


Bron: Genepax

The website of the Watergas.NU foundation offers visitors a central point for information and communication. Members can make-up their own web page to present themselves and their products. These web pages offer an opportunity for interaction. Together with you we would like to collect an interesting depository of knowledge for both visitors and members.

4. What is watergas?

Watergas is gas made from water. One can produce this gas in different ways. Hence, watergas is a family name of gasses made from water.



a) Elektrolyses at low tension produces a mixture of hydrogen and oxygen (mostly indicated as HHO or Brownsgas). HHO contains about twice the amount of energy per cubic meter as does plain hydrogen (H2). Increasing experience in cars, lots of experience in welding equipment;
b) Elektrolyss at high tension produces a watergas as well, but this technology is still in development;
c) Elektrolyses at high tension in combination with carbon hydroxides (syngas and magnegas), The technology is in development.

All watergasses do have the property that they deliver much cleaner energies. Emission of CO2 is drastically reduced or even is not produced at all.

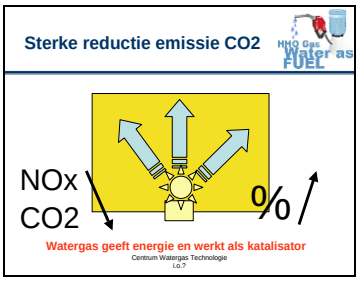
In engines it is observed that although the burning process is momentarily more intense, the development of NOx is being reduced. Because the burning of watergas is so extremely fast. NOx just doesn't get the opportunity to develop (basiccally NOx is burnt air).

We will use the term 'watergas' mostly, also for the first kind of watergas. This type of watergas has got several names, such as HHO, Brownsgas, Rhodesgas and many more, depending upon the ego that 'invents'it.

Watergas however is known for about 150 years. The first internal combustion engine ran on watergas in the year 1865. HHO and Brownsgas are most used for type a) watergas. While for the purpose of googeling you get the best results with the acronym 'HHO'.

5. Watergas in engines

Due to the high speed of propagation of burning watergas, the gas acts predominantly as a catalyst, when mixed with diesel, gasoline or LNG. The effect is that the emission of both CO2 and NOx is drastically reduced (see addendum 1). Normally one can save from 15 to 40% on fuel.



In older cars without advanced motor management systems, one can just induce watergas into the air inlet. One will normally yield much better mileages.

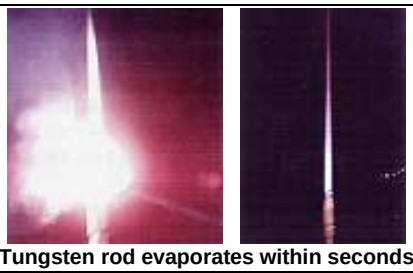
However, in modern cars one should manipulate the parameters in the software of the motor management. Without manipulation of the motor management system, this system will order a higher fuel input. One of the sensors indicates more oxygen in the exhaust gasses. The motormanagement tries to correct by adding more fuel.

With smaller engines, such as small generators, theoretically one could run them on watergas alone. However, it is expected that the engines will get to hot. Recently ExxonMobil has aired a short video message in which a saving of up to 80% is reported.

7. Watergas for welding

Watergas has been applied in the diamant industry for ages, because it is so clean. Watergas is used for cutting and welding steel and glass as well. Samsung uses watergas in the production process of plasma screens.

Watergas has an attractive flame because it leaves no stains of unburnt carbon on the product. The product of burning is water.



Tungsten rod evaporates within seconds

The interesting aspect of the use of watergas is that each type of material reacts differently on the touch of a watergas flame. One can even cut Tungsten with watergas. The melting point reaches a temperature of about 3000 degrees centigrade! One can even melt an iron bar to a brick (!?).

8. Production of Watergas (HHO)

The modern watergas units are smaller in size compared to the early models. The picture in the box is a cell for use in a car.

Watergas; de Nieuwe Doos

Verne voorzag dat elektriciteit en water belangrijke .
energiedragers zouden worden.
Yull Brown vond uit hoe dat kan!
Er komt nu een nieuwe generatie watergasgeneratoren.

Stichting Watergas.NU

In particular in the USA and Asia watergas is in the upping. An increasing number of watergas units are offered in the market to get ‘more miles from a gallon’. For both the auto owners as for the climate this is a pragmatic first step.

A recent test at the Dutch research institute TNO supports the more efficient burning of fuel with the addition of watergas (strong reduction of CO). However, the interaction with modern motor management demands more attention!

TNO found more fuel consumption, while Watergas addition of only 1/1000th of the volume of air already upsets the motor management system. How can?

How to manage motor management to take profit of the addition of watergas?

Public interst in watergas will only increase. The Japanese firm HAW runs a car on 100% water! This is a car that runs on H2, air and water. The retrofitted engine is basiccally a H2-fed steam engine! Could this be done with watergas as well?

9. Innovation by getting on grips!

With the launching of 'Blue Challenges' we want to stimulate firms to apply watergas. Each Blue Challenge aims at a specific application. For example watergas on scooters. Young people will turn their heads!

Blue Challenges will provide new insights and innovation. We invite companies and investors to participate in Blue Challenges. Either as participant or as Sponsor.

With pilot projects we can show that it works. Let’s get on grips with watergas. The future market is enormous!

Participate in a pilot project with one of our members.

Watergas.nu will support these projects with knowledge. Please contact us if interested: info@watergas.nu.
Are you interested to support us as a future consumer of watergas apllications? Please become our sponsor. Your support will be duely appreciated!

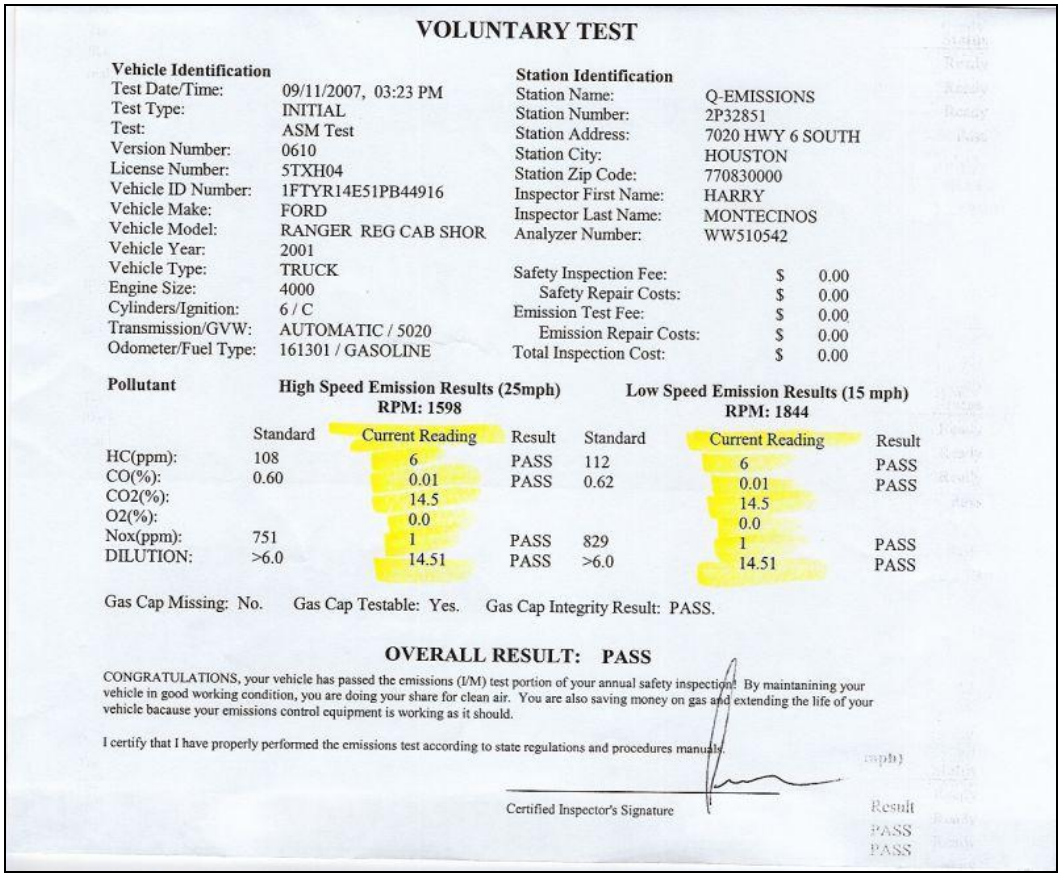
10. Innovation by research!

Lots of basic research is still required. Scientists are not yet eager to enter into the field of watergas. But we need you! Could we cooperate with the Dutch research institution Wetsus? Or can we find a place at a university or a university school? Addendum 5 contains a first sketch for a research agenda.

Establisch a LEARNING Chair on a University and/or University School. Then we can reinvent this 150-year old watergas together with the next generation.

Addendum 1. Emission test Watergas in USA

Reduction of emissions duet o addition of watergas is confirmed bye mission tests from USA



VOLUNTARY TEST

Vehicle Identification

Test Date/Time:	09/11/2007, 03:23 PM
Test Type:	INITIAL
Test:	ASM Test
Version Number:	0610
License Number:	5TXH04
Vehicle ID Number:	1FTYR14E51PB44916
Vehicle Make:	FORD
Vehicle Model:	RANGER REG CAB SHOR
Vehicle Year:	2001
Vehicle Type:	TRUCK
Engine Size:	4000
Cylinders/Ignition:	6 / C
Transmission/GVW:	AUTOMATIC / 5020
Odometer/Fuel Type:	161301 / GASOLINE

Station Identification

Station Name:	Q-EMISSIONS
Station Number:	2P32851
Station Address:	7020 HWY 6 SOUTH
Station City:	HOUSTON
Station Zip Code:	770830000
Inspector First Name:	HARRY
Inspector Last Name:	MONTECINOS
Analyzer Number:	WW510542

Safety Inspection Fee:	$	0.00
Safety Repair Costs:	$	0.00
Emission Test Fee:	$	0.00
Emission Repair Costs:	$	0.00
Total Inspection Cost:	$	0.00

Pollutant	High Speed Emission Results (25mph) RPM: 1598			Low Speed Emission Results (15 mph) RPM: 1844		
	Standard	Current Reading	Result	Standard	Current Reading	Result
HC(ppm):	108	6	PASS	112	6	PASS
CO(%):	0.60	0.01	PASS	0.62	0.01	PASS
CO2(%):		14.5			14.5	
O2(%):		0.0			0.0	
Nox(ppm):	751	1	PASS	829	1	PASS
DILUTION:	>6.0	14.51	PASS	>6.0	14.51	PASS

Gas Cap Missing: No. Gas Cap Testable: Yes. Gas Cap Integrity Result: PASS.

OVERALL RESULT: PASS

CONGRATULATIONS, your vehicle has passed the emissions (I/M) test portion of your annual safety inspection! By maintanining your vehicle in good working condition, you are doing your share for clean air. You are also saving money on gas and extending the life of your vehicle bacause your emissions control equipment is working as it should.

I certify that I have properly performed the emissions test according to state regulations and procedures manuals.

Certified Inspector's Signature

Texas

Addendum 2. Caloric value of Watergas

Burning of H2 and O2 into water is a two-step proces.

2 H2 + O2 ➔ 4 H1 + 2 O1 ➔ 2 H2O

a)	4 H1 + 2 O1 ➔ 2 H2O	*442,4*	*kCal*
b)	2 H2 + O2 ➔ 4 H1 + 2 O1 ➔ 2 H2O	*115,7*	*kCal*
c)	*a)/b) = HHO/H2+O2 Energy*	*3,82*	*E-factor*
d)	*Volume HHO/H2+02 (Lavoisier)*	*2*	*V-factor*
e)	*c)/d) = E-factor/V-factor*	*1,91*	*E/V-factor*
f)	*Caloric value H2*	*3,61*	*kWh/m3*
g)	*Caloric value of stoichiometric mix of H2 + O2*	*2,41*	*kWh/m3*
h)	***e) x g) = Caloric value of HHO at optimal production***	***4,61***	***kWh/m3***

source:Wiseman/Eagle Research *HHO Book One*

Theoretically the caloric value of watergas amounts to 4,61 kWh/m3. Not all watergas generators work along the same process.

Generators used for welding normally deliver an optimal gas in terms of water to gas production (1 liter water delivers about circa 1866 liter watergas (brownsgas)), although their efficiency in terms of energy is less. This watergas will have a caloric value of about 4.6 kWh/m3.

Generators used for the automotive sector produce about 1350 liter watergas out of one liter of water. Thus, the caloric value amounts to about kWh/m3. These generators turn out tob e more energy efficient.

Addendum 3. Proposed first research clusters by Watergas.NU

Basic Characteristics

1. Basic Characteristic measurement: efficiency of elektrolyses from Electricity →Watergas
   Note: difference in technology of electrolyses, Choose one,
   Later to be extended to other technologies;
2. Basic Characteristic measurement: efficiency heat production Watergas → Warmte
   Note: apply watergas heat exchange device from plumbing technology.

A. Particulate matter/CO2

Measurement of watergas addition to internal combustion engines

3. Research on motorstand on relatively simple engines without motor management
   Note: Gasoline and Diesel (particulate matter)
4. Parameters IN
   Watergas 1 lpm/liter cilinder volume, Moment of injection, Moment of ignition,
5. Parameters IN and UIT
   CO, CO2, CH, NOx, O2, H2O,
   Note: if possible measurement of heat in combustion chamber
   Note: if possible shoot video of propagation in combustion chamber

B. High-Performance heating systemens

Measurement of caloric value of the flame at different media (Tungsten, Wolfram, Alu-Oxide, Carbon, Stone, Ceramics,..), tob e executed in wind chamber.

1. Heat dissipation in different media
   Shoot video of heat development in media,
   What happens with the media after melting? What kind of gasses are produced?
2. Weighing and measurement with gaschromatograph in wind chamber
   Note: take measurement of incoming air as well with gaschromatograph

C. Implosion/Explosion

Extension of research to the behavior of ignited gas in chambers

1. Set-up with a long glass tube (length about 30 times initial volume),
   very fast video shoot of about 30.000 frames per second
2. Compare ignition of pure Watergas with ignition of pure stoichiometric H2/O2 as reference
   Parameters: burningtime, temperature, development of pressure and volume, radiationg

D. Dual fuel flames with watergas

1. Upgrading of hydrocarbon flames
   Flames of hydrocarbons can be made cleaner by adding watergas. Burning becomes more efficient.
2. Downgrading of watergas flames
   Watergas flame scan be tempered by adding hydrocarbons (e.g. alcohols). Burning becomes less extreme.
3. Experiment with both stoichiometric mixture of H2 en O2 and HHO (in itself stoichiometric).
   Compare characteristics of both the flames, without addition cf 1en 2 and with addition cf 1 en 2.

Addendum 4. Basic measurement by the International HHO Institute (IHHOI)

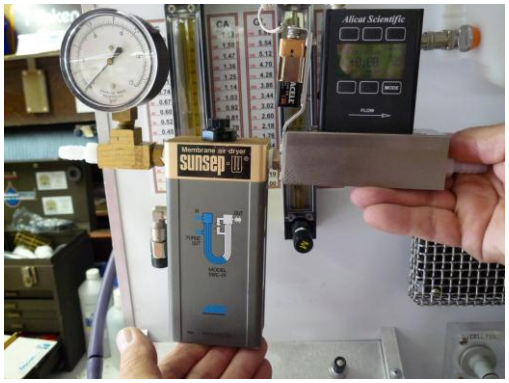
Each system submitted for testing will be measured at 4 different timed intervals:

- 5 mins.
- 10 mins.
- 30 mins.
- 60 mins.

At each interval the following measurements will be taken:

- Gas flow volume
- Mass flow
- Gas pressure
- Gas temperature
- Electrolyte temperature
- Input voltage
- Amps (current draw)
- Watts

Each set of tests will be photo documented.



Equipment:

Power Source: The power source for all automotive cells is a motor driven automobile alternator and battery. We use a Delco 140 Amp automotive alternator driven 1:1 by a 2 HP 3450 RPM Marathon AC motor. The battery is a 225CCA gel cell type. When viewed on an oscilloscope, you would see that there is a significant A/C ripple on the DC voltage. The actual voltage is recorded for each test, and is approximately 13.8 volts. This system is used because it parallels the actual power conditions of a vehicle while cruising.

Digital DC Power Watt Meter, Model HB404: Used to measure DC Voltage, DC Amperage, and DC Watts. Calibration certified by Broadview Instrumentation Services, 7632B Hub Parkway, Valley View, Ohio 44125.

Auber Instruments SYL-1813 Multifunction Autometer with an RTD PT100 Temperature Sensor: Used to measure electrolyte temperature. Calibration certified by Broadview Instrumentation Services, 7632B Hub Parkway, Valley View, Ohio 44125.

Alicat M-50SLPM-D Mass Flow Meter: Used to measure HHO gas volume and mass. Calibration certified by Alicat Scientific, Inc. 7641 North Business Park Drive, Tucson, Arizona 85743. Calibrated to read a maximum of 30 LPM in any of 31 different gases including HHO specifically.

Last Updated on Thursday, 15 October 2009 16:28

Addendum 5. Proposal for scientific and applied research

The field of research covers five parallel streams:

1. Fundamental scientific research
   - Basic measurement of energetic balance
   - Gaschromatography
   - The influence of the elekrtolyte
   - The Joe Cell as a measuring device
   - The flame of watergas
   - Cell morphology and applied materials
2. Applied Scientific Research
   - Watergas in internal combustion engines
   - Watergasvlam in combination with hydrocarbons (dual fuel)
   - Watergas in process industry and agriculture
   - Watergas and the Sick Building Syndrome
   - Watergas in medical science
3. Applied Technological Research
   - Watergas and safety
   - Intelligent process management of watergas in internal combustion engines
   - Intelligent process management for optimisation of power trains (new technologies)
   - Watergas retrofit in intelligent cars
   - Watergas and retrofit large diesel generators)
   - Application in shipbuilding, agriculture and construction sectors
   - Watergas applications in air- and space?
4. Market research
   - Characteristics of technologic applications
   - Testing and licencing of watergas products
   - Towards supply chain management of a watergas industry
   - Impact of a watergas-elektranet on society.
   - Economic aspects of a ‘watergas-elektranet’.
5. Chain management
   - Integration and combination with other sustainable processes
   - Power trains with watergas, in particular with Heat-Power Combinations
   - Smartgrids with watergas
   - Role of big industry and small- and medium businesses in the development of watergas

This list is certainly not complete. But let’s get on grips! Water burns. Let’s use it as from now. Please contact Watergas.NU if you are interested to sponsor or to be involved in one of these topics.