



Part IV

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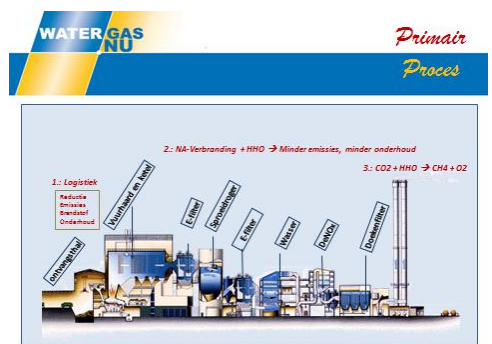
**Overasselt, the Netherlands
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Bin man and Gold?

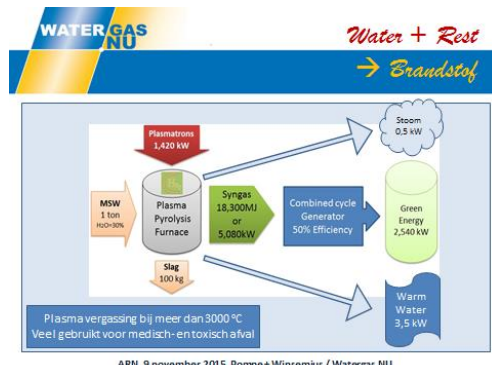
We overlook the parking lot of the Waste-Recycling Company. Director Pieter tells enthusiastically about his business. Focus is on sustainability: Part of the energy produced is used in their own primary process. Pieter and his company look to the future. Revenues from the supply of electricity decrease. Costs increase. Don't sit and wait until the lines intersect. The staff brings many ideas to make more energy efficient. In addition, they are looking for new products with high heat demand, for example in the process industry. We tell him about the 'normal' watergas or 'Hydrogen on Demand'. You'll get a more efficient combustion of hydrocarbons. The director reacts swiftly: "If I see this in my cauldron then I get all stuffy. My oven will melt down - it is already so very hot!". Off-gases can be treated with watergas after initial incineration just before they are being filtered. The filters will last longer. That saves a sip on a drink (Dutch saying)!

Further in the primary process watergas can help to get cleaner and more efficient engines. That means reduced engine maintenance. Finally, we tell about the recent development of the Watergas Heater. With this technology hot water can eventually be produced for about 9 Euro per MWh. Then we are cheaper than natural gas!

But Peter does not want to hear that. He read of the Water Dragon. He wants to hear about the Water Plasmatron and the Steam Multiplier. We believe that with plasmatron technology his company can look into two directions. First, one can pyrolyze undried residues. The existing landfill can be cleaned up. On the space that becomes available, a process plant can be constructed. There is even a European association which promotes cleaning up old landfill sites with plasmatrons. This is a recent development! Plasmatrons process several residues. The great thing is that feed stock does not have to be dry. That saves a process step. It feels natural that pyrolysis of household waste is barely profitable without subsidies. Gasification of rubber, lignite or coal, however, is particularly interesting. Pyrolysis with water plasma (high enthalpy) can be realized very environmentally friendly. Finally, the company may seek out the niche markets of gasification of medical waste, toxic waste and offal.



**"Plain" watergas saves fuel
In primary process with less emissions.**



Pyrolysis of waste produces steam, hot water and electricity in a circular process.



Pieters company produces steam of 40 bar and 400 ° C. This steam can be used in the 'Steam Multiplier'. Enter the steam into the plasmatron as a propellant gas. Use distilled water - cooled vapor from the chimney - to produce new steam. This 'multiplied energy' can compensate for the imbalance in the electrical system (steam turbines are very flexible). The extra steam production may also be supplied to the heat network. New housing estates have a smart grid for heat. A central heat line however is not essential, because eventually we want to produce water-heat in containers at a central location in a residential area.

Peter reacts enthusiastically. He sees other applications. He can deliver hot water to greenhouses for combi-cultures -: fishing culture (eg Tilapia) is the basic crop. Food crops are cultivated on top of the ponds with the roots in the water. The fish eat maggots and worms that are grown on waste underneath the fish basins. Digesters convert the waste into methane. His company can do this by itself as well.

On hearing the word Methane we ourselves do a little extra. Recently articles on the transformation of carbon dioxide to methane with the aid of steam and / or hydrogen gas have been published.

Our proposal is to set up a joint trial operation. The focus will initially be aimed at hot water or steam production. In addition, we wish to cooperate with universities to develop a water plasmatron for the steam-multiplier. For the carbon — dioxide-methane process we will seek cooperation with Wetsus, the water institute in the city Leeuwarden, the Netherlands.

Who are the stakeholders? In first place, the consumer, who will pay less and less for energy. Governments have a very important interest, because water-energy consumption does not need to be subsidized. And investors have an interest because the technology can be invested in. So water-energy provides for jobs.

Peter jumps up. He shouts, "I'm going to rename my business!

We are an 'Up-Cycling Plant'! From waste we produce energy. We use CO₂ to make methane for city buses and for my own trucks and shovels. With steam and power we produce even more steam and power. We produce food for plants and people ". Outside a car is parking. "Gentlemen, my Commissioner, I am going to propose this to him directly".

That bin man really has gold in his hands!