

PROFITABILITY OF TECHNOLOGY FOR OBTAINING OF BROWN'S GAS FROM SEAWATER AND ITS REGENERATION BY EXTRACTION OF MINERALS



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- From numerous attempts have found that by input energy of 1 kWh, can be obtained approximately 300-350 liters of Brown'gas, but from pure distilled water. Iliia Valkov has achieved efficiency of over 500 liters gas from 1 kWh of energy input, reaching a maximum current consumption of about 90 Amps. This means that for the decomposition of the water molecule per liter of water or for the production of 1860 liters of gas per liter of water has reached an energy consumption of up to 3.72 kWh.

- Since the project is not purely distilled but sea water with many different minerals dissolved, when the water molecule breaks down, the balance is approximately 10: 1, that is, out of every 10 liters of seawater, about 1 kg of dry substance with a residual moisture content of about 25% is released upon decomposition of 1 liter. This result is for a process without continual addition of fresh seawater. When constructing the electrolysis apparatus and the power unit for seawater electrolysis, I took into account the experience of my predecessors. Nearly everyone conducts electrolysis with a current consumption of around 30 A.

- Ilia Valkov has reached a consumption of up to about 90 A when electrolysis of pure distilled water with KOH added. And that's what led to the continuous burning of the power supply from my equipment, and I had to constantly increase the load on the final stage until finally I got a steady and stable current with small fluctuations in different types of natural water sources to about 200 amps. This means that the electrolysis efficiency of this technology is significantly higher. And how much more efficient this technology is?

- In the preparation of samples for analysis in laboratories, after the inclusion of new powerful batteries, two 100 Ah and a maximum current of 850 A, with a duration of electrolysis of 40 minutes at a current consumption of 198 A and a mean voltage of 12.5 V, the reading consumed power was
 $198 \text{ A} \times 12,5 \text{ V} = 2475 \text{ W} = 2,475 \text{ kW}.$
Since electrolysis lasts 40 minutes per hour, the energy consumed for 40 minutes was:
 $2,475 \text{ kW} \times 40/60 \text{ h} = 1,633 \text{ kWh}.$

- The amount of water that turned into Brownow Gas (BG) was the area of the bathtub on the reduced water column of 4.8 mm, ie. $36.3 \text{ cm} \times 25 \text{ cm} \times 0.48 \text{ cm} = 0.435$ liters of water / 40 minutes
or
 $0.435: 40/60 = 0.660$ l water / hour.
ie. from 0.660 liters of water / h x 1860 liters, I received 1227.6 liters / h of Brownish Gas or the decomposition of 1 liter of water using this technology will require 3.75 kWh of energy.

1. COST OF PRICE WITHOUT REGENERATION OF BROWN'S GAS ENERGY, IF IT IS DISCHARGED AT THE ATMOSPHERE

- The cost of 1 kg of dry matter sludge WITHOUT REGENERATION of the produced energy and without additional energy generated from the incineration of municipal waste will be

2,475 kWh of energy x 0,20 BGN / kWh = 0,495 BGN / kg of sludge

- The conclusion is that in such a scheme, without using the energy of produced Brown gas for regeneration, the return of the produced energy at the entrance to reduce the external energy supply is NOT EFFECTIVE. This is evident when comparing the price obtained with the exchange price of the ore at a rate of USD 1.83 / dollar

- At a stock exchange price of the ore to retrieve:
Iron - 80 \$ / ton = 0.08 \$ / kg = 0.146 BGN / kg
Chromium - 180 \$ / ton = 0.18 \$ / kg = 0.329 lv / kg
Nickel - \$ 107 / ton = \$ 0.107 / kg = \$ 0.195 / kg
Uranium - \$ 250 / ton = \$ 0.25 / kg = \$ 0.457 / kg

Content of metals	Laboratory Dial- Buhovo	Laboratory EUROTEST = Sofia	Laboratory to NON-FERROUS METAL COMPANY - PLOVDIV	CONTENT OF METAL IN ORE	CONTENT OF METALS INTO SEDIMENTS
Chromium	3,23 %	6,81%	6,00 %	26 %	0,001549 %
Ferrou	15,24%	18,74%	27,60%	30%(Крем.)	Няма данни
Никел	1,85%	2,58%	3,4%	1,8-1,9%	0,002%
Uranium	0,0019%	-	-	0,01-0,1%	-

COSTS OF SLUDGES BY REGENERATING OF OBTAINED BROWN'S GAS AND FROM SEAWATER

- The efficiency or magnitude of electrolysis is the ratio between of produced Brown's gas 1227.6 liters to the Brown's gas, which can be obtained from 1 liter of water - 1860 liters or

$$1227.6 \text{ L} : 1860 \text{ L} = 0.66 = 66\%$$

If fuel is used in power generation, the fuel cell capacity of cogeneration as set in the project is about 90%. Then the efficiency will be:

$$\mathbf{0.66 \times 0.90 = 0.594}$$

- or 59.4% of the energy input can actually be regenerated:

$$2,475 \text{ kWh} \times 0,594 = 1,470 \text{ kWh}$$

- Or

-

$$2,475 \text{ kWh} - 1,470 \text{ kWh} = 1,005 \text{ kWh}$$

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I.e. to be produced 1 kg sludge, the needed energy is approximately of 1,005 kWh.

Or the value of the sludge cost would be:

$$1,005 \text{ kWh} \times 0,20 \text{ lv} / \text{kWh} = 0,201 \text{ lv} / \text{kg sludge},$$

I.e. the cost of 1 kg of sludge is almost equal to the value of 1 kWh el. Energy.

Table for comparing of energy content in different fuels with the content energy into the household wastes

Fue	MJ/kg	kWh/kg
Coal	30	8,33
Domestic wastes	9	2,50
Dry biological wastes	16	4,44
Fresh grass	4	1,11
Natural Gas (methane)	55	15,27
Paper	17	4,72
Cooking oil	42	11,66
Slightly Balanced	15	4,16
Commercial wastesТърговски отпадъци	28	7,77
Sugar cane residues	17	4,72
Green (fresh) wood	6	1,66
Dry wood to 20 % moisture	15	4,16

- This technology involves supplying Brown gas to the furnace only at the beginning to ignite the waste, after which combustion is stimulated and maintained by the forced introduction into the furnace of air through a fan driven by the turbine.
From the enclosed table, it is clear that the mass waste of household waste is 9 MJ / kg or 2.5 kWh / kg.
When the cogeneration is applied, the plant's efficiency will be about 0.8 or the energy used for the incineration of municipal waste will be:
 $2.5 \text{ kWh / kg} \times 0.8 = 2.00 \text{ kWh / kg}$

- With this household waste calorific value, for a 100% full regeneration of the energy input to obtain Brown gas of 1 liter of water, a minimum of
3,75 kWh / 1liter water: 2,00 kWh / kg.household waste = 1,875 kg
househole wastes / liter H₂O.
- Or approximately every 2 kg of household waste will produce enough energy to decompose 1 liter of water for complete regeneration without introducing external energy to the process.

- In dependence of the installation's purpose, this technology can find 4 types of applications according to what we want to have:
- 1. Plant intended for the incineration of municipal waste.
In this installation, the use of produced Brown's gas is a small part of the total amount of energy and serves only to ignite and maintain the combustion process. The resulting minerals accompany the process.

CONCLUSION!

- 1. The resulting energy is used for both regeneration and production of electricity and heat. This application is characterized by the fact that at the output the energy obtained is many times greater than the input, the size of the more energy produced depends on the amount of waste destroyed.

- 2. Plant intended primarily for the production of sludge as a raw material for metallurgy, black, non-ferrous and rare metals. In such an installation, the amount of waste incinerated is limited and is used only as accompanying production for complete regeneration and energy self-supply without the use of external power supply.

- **3. Installation for electricity and heat generation.**
- This installation is with four additional options (bonuses):
 - Electricity and heat generation;
 - Destruction of household waste;
 - Production of polymetal minerals as a raw material for ferrous, non-ferrous and rare metals metallurgy;
 - Extraction of clean drinking water, which also transforms the technology into a desalination plant.

- 4. Plant intended for the treatment of highly contaminated industrial tailings ponds, including radioactive contamination.

For such a purpose, we again have the four options as follows:

- Electricity and heat generation;
- Destruction of household waste;
- Production of polymetal minerals as a raw material for ferrous, non-ferrous and rare metals metallurgy;
- Extraction of clean, distilled water, which, besides drinking water, can also be used to recultivate contaminated soils;

- **NOTE:**

- When using the technology for purification of highly contaminated tailings ponds, including radioactive waste, the installation will work with **LOWER LOAD** due to the worse conductivity of the water.

- **THANKS FOR ATTENTION**