

TECHNOLOGIES FOR THE MILLENNIUM

Hydraulic Energy Generator HEG

The Russian inventor, V. V. Marukhin, doctor of technical sciences, has developed a revolutionary energy system, which is based on a permanent hydraulic-pneumatic oscillation process.

The fluid-oscillation generator is the consequent further development of the known hydraulic ram pump. The latter operates automatically every second by means of an interplay between fluid pressure and vacuum, as long as a fluid reservoir is present under a gravitational potential or a constant fluid flow.

After intensive study of the theoretical foundations of Zhukovsky (1897) and S. Christopolsky (1930), V.V. Marukhin realized that such systems can work when properly adjusted without water losses taking into account the extended Bernoulli equation. **Such systems operates self-sufficient.**

The key to the autonomous mode of operation is the replacement of the classic shock valve by an internal repulsion valve which opens and closes in the course of the oscillation of the fluid inside the fluid tube.



System Description

In a first phase, Dr. Marukhin started to build **large-scale plants** which are working in the gravitational field from 2005 onwards. They require a minimum pressure (for example 20 m depth of immersion in water). With an overall height of 8 m, a diameter of 2,8 m and a weight of 34 t the generator with a special turbine generates **an autonomous power of 1,000 kW from the pulsating fluid flow.**

In a further phase, Dr. Marukhin developed a system which, by reducing the overall height to 0,8 m, with increasing the internal pressure to e.g. 3,000 bar and an increase of the oscillation frequency to about 3,000 Hz delivers power up to 1,5 MW. **The newest version of 0.42 m height delivers 1 MW.** Such systems are converting energy by coupling to the atomic lattice vibrations.

The **fluid oscillation is converted into electrical energy by means of piezoelectric ceramic cylinders** which produce a triangular pulsed high voltage during the fluid vibration, the charges being accumulated on a special charging capacitor. After rectification, DC-DC down-conversion and inverting via DC-AC converter, any desired output voltage and frequency can be generated.

Market advantage:

A 1 MW plant delivers per year about 8,6 GWh. If such an installation completely replaces grid cost of 0,11 € Cts / kW, this corresponds to a brutto amount of 0,93 million euros per year. A 0,5 MW plant delivers per year about 4,3 GWh. With net income of 0.65 million euros and a total investment of 0.98 million euros, the plant will pay for itself in 1.5 years

Optimal application possibilities

Owing to the small dimensions, such systems are predestined, e.g. in combination with pumps for desalination plants, or with direct coupling of electric motors for driving of locomotives, ships, airplanes or simply for decentralized energy production.

Scientific/technical references :

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http://scienceph.ru/f/science_and_world_no_8_84_august_vol_i.pdf see pages 33-70.