



**VA Renewable Energy, LLC, a subsidiary company of GV Designs, LLC,
offers several projects that could be of economic interest.**

**Construction of mini hydroelectric power plants VA-MHS,
using the latest technology developed by VA Renewable Energy, LLC**

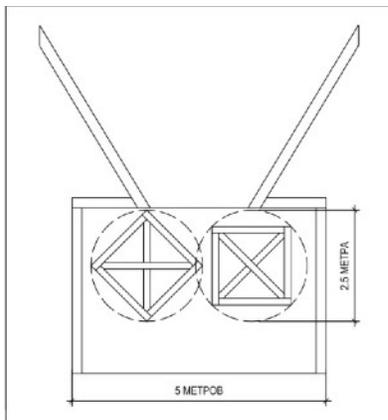
The implementation of such a project will be able to make a significant contribution not only to providing any country with inexpensive electricity, but also to increase the export of electricity to neighboring countries..

PROPOSAL FOR INSTALLING THE HYDROPOWER SYSTEM VA-MHS

From now on, the proposed Mini Hydroelectric Power Plant will be referred to as VA-MHS.

VA-MHS is placed in the water stream. The VA-MHS system consists of two vertical axes with rotating blades, each containing four rotating fins. Ribs on opposite blades are offset 45 degrees from each other. These blades, rotating under the pressure of the water flow, convert the kinetic energy of the water into mechanical energy. The mechanical energy is then converted into hydraulic energy by means of a PDP piston pump, which pumps the hydrolytic fluid to an onshore generator, converting it into electricity. Thus, there is NO electric current in the water and above the water.

Blade diagram (top view)



Typical VA-MHS station dimensions:

Width 5 meters

Depth 2.5 meters

Height 2.5 meters

We can control some or all of the water flow with the intake walls, directing it through the center of the system. This makes it possible to increase the water flow rate, which increases the power of the system.

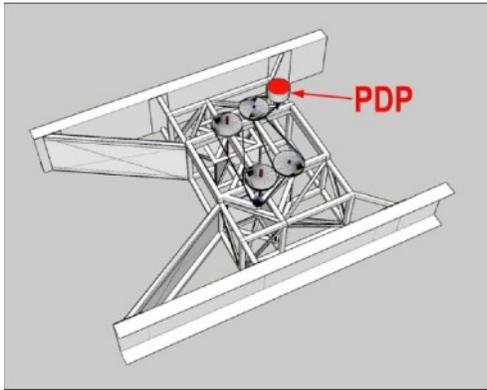
Passing through the center of the VA-MHS, the water spins two opposing shafts with blades. These two shafts are connected by a drive chain, forming a powerful driving force, which transfers its mechanical energy to the "PDP" piston pump.

One of the problems we encountered when getting power from a water current generator was the low rpm generated by the rotating fins. MGS is a high torque power drive system, not a conventional high speed drive system. Almost all modern systems use high RPMS to drive their systems, and this is a good way to use non-renewable energy sources (coal, oil, natural gas, peat, nuclear fuel) or hydropower. Due to the desire to use only environmentally friendly energy of moving water, we need to workaround low speeds.

The second problem we faced was a possible change in water speed. A standard positive displacement piston pump could be the solution to this problem. It is designed to operate at higher speeds, typically around 1800 rpm, and has an efficiency of around 85% at that speed. The same type of pump, operating at speeds below 50 rpm. will reduce its efficiency to almost zero.

We were able to solve this problem by developing the PDP piston pump.

Connection diagram of shafts and pump "PDP"



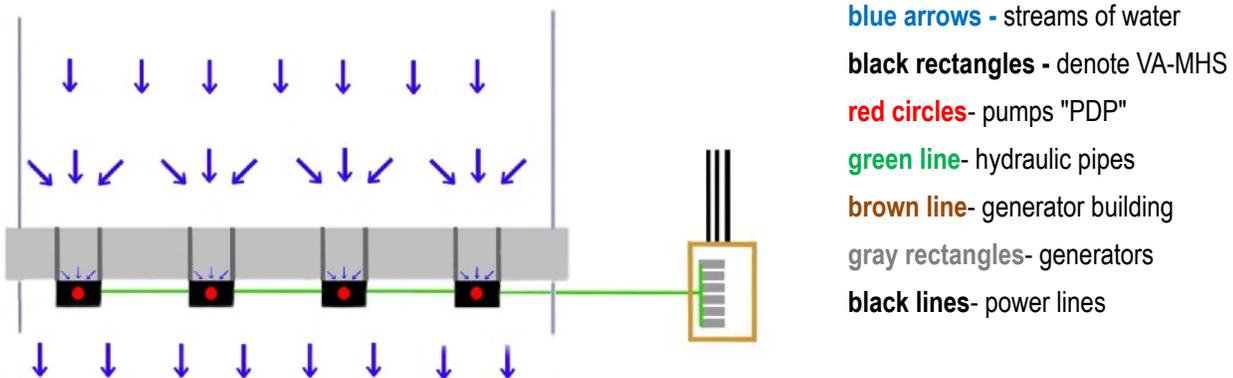
The PDP pump is designed for our hydraulic fluid handling system:

Low RPM and high pressure - around 3000 psi.

The efficiency of our PDP pump reaches 99%.

Our "PDP" pump pushes biodegradable hydraulic fluid through a regulator that controls the pressure and volume of the hydraulic fluid to a hydraulic motor, which is connected to a generator through a gearbox.

System and water interconnection drawing



The biggest problems involving hydraulics are contamination and solar heating are. We use a closed loop system that eliminates the pollution problem. The heating problem is solved by laying pipelines in the water to the hydraulic motor, PDP pump and vice versa.

The hydraulic fluid flow regulator allows only the volume and pressure required to be supplied to the hydraulic motor.

The VA-MHS and piston pump use Nylatrol material, which is maintenance-free for the entire life of the system

We use high quality generators that are manufactured to our specifications so we can meet any electrical requirement. The generator can produce 110, 240, or 480 volts, single or three phase AC at 50 Hz or 60 Hz. The generator is serviced approximately every 5 years.

All VA-MHS metal structures are made of stainless steel and are designed to last at least 40 years.

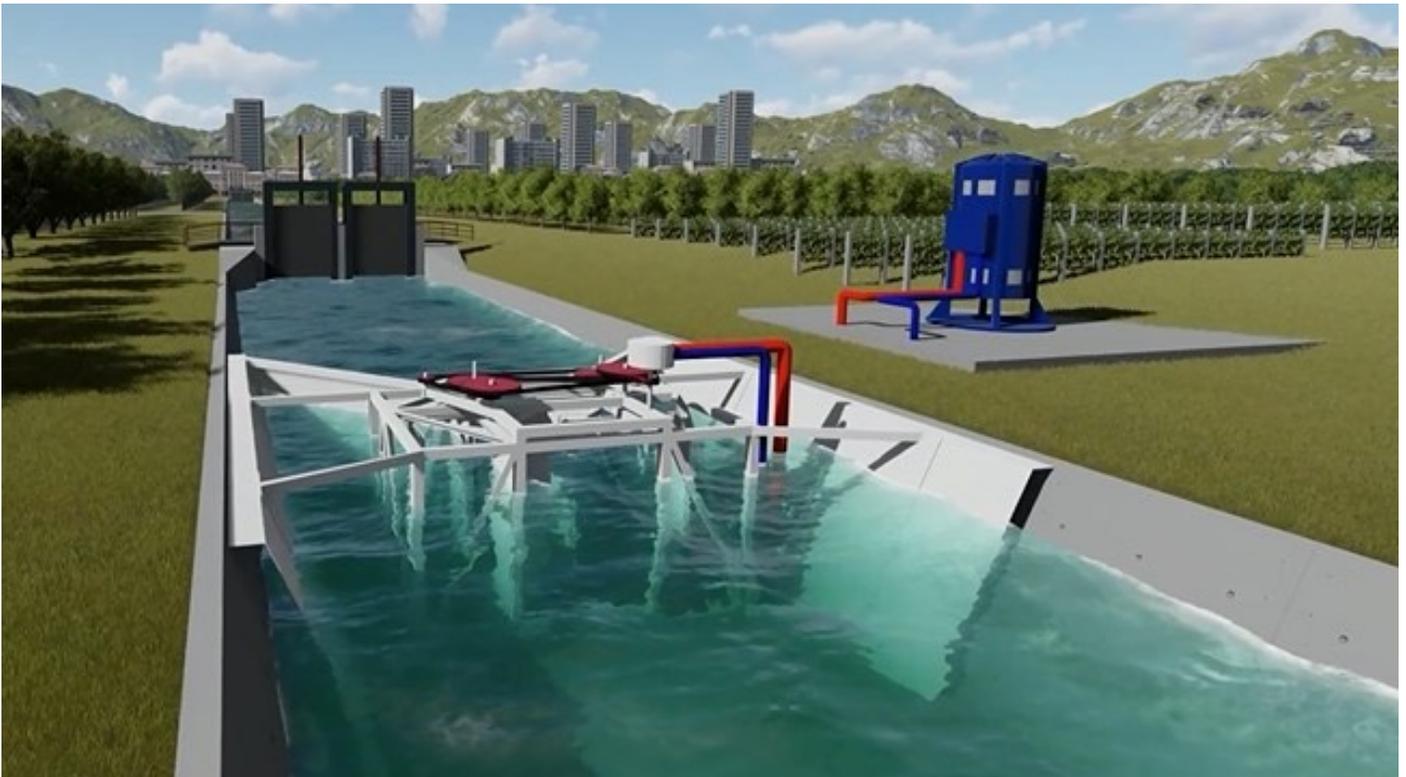
The performance of the VA-MHS depends on the depth, width and flow rate of the water. No two water sources are alike, so it is important to have accurate information about each location of the proposed VA-MHS installation in order to pre-calculate the VA-MHS capacity.

With a reliable water supply, VA-MHS can supply energy at a lower cost than other alternative energy systems. It is a reliable, efficient, environmentally responsible, low maintenance system.

The VA-MHS can be seen during the installation of a 5 kWh demo unit.

VA-MHS advantages:

- No CO2 emissions
- Stable electricity production 24/7
- No non-renewable energy resources required to operate
- No electrical components in or above water
- Life expectancy of the station is 40 years
- Improving quality of water by additional aeration
- Low cost of electricity generation
- Low maintenance costs
- Does not interfere with fish migration, which means fish remain unharmed
- Can be installed downstream of the existing dam to increase the capacity of the hydropower plant
- Requires only a small plot of land (only need space for the generator)
- No danger of environmental pollution (nuclear, gas, oil or coal)
- Does not require specially trained personnel to perform maintenance
- Maintenance or repairs can be performed without interrupting the water flow



Construction of a Municipal Waste Processing Plant (MWRP-VA), using the latest technology

VA Renewable Energy LLC, offers a project to create waste-to-energy plants.

From now on, the proposed waste processing plants will be referred to as MWRP-VA.

The MWRP-VA is an innovative, flexible, modular plant. It can be a successful model for cooperation between the generation of raw materials for energy from garbage and waste, and the need for garbage disposal.

Waste recycling technologies used in MWRP-VA are among the most modern. The MWRP-VA plant will be able to spearhead the continued and persistent efforts of the Municipal Service to improve waste management. The combination of resources, technology and the willingness of society to change the way we handle waste and waste is key to conserving environmental resources.

The MWRP-VA mill, which uses industrial and municipal waste as a combustible material, has become a recognized supplier of an environmentally friendly source of fuel widely used in industry. Sorting of household waste is carried out using advanced technological methods. Plastic bags, other plastics, textiles, tree trimmings, cardboard and paper are recycled into alternative fuels (such as syngas).

The MWRP-VA project will unite country with the most technologically advanced countries in Europe, reducing the negative impact on the environment and reducing the consumption of energy from traditional sources. This is another step towards realizing the vision of country industry, which considers environmental protection to be of the highest value.

The MWRP-VA can handle almost any type of waste; municipal, commercial, industrial, medical, construction and agricultural waste.

MWRP-VA has three main types of recycling systems:



BIOREACTOR FOR ORGANIC WASTE



**PYROLYSIS REACTOR FOR ORGANIC
WASTE**



DEBRIS GRINDERS

There are two different types of reactors and shredders used to process waste. Inorganic and medical waste is processed in our special pyrolysis reactor, and organic matter is processed in bioreactors.

This treatment significantly improves processing efficiency by creating more fuel with less parasitic load requirements.

MWRP-VA is 100% recyclable, nothing goes to landfill. This is the main uniqueness of our system.

In all other systems there is a so-called "release of inert material", which requires it to be buried in the ground, therefore the problem of toxic substances in these systems is not completely solved.

At MWRP-VA, a significant portion of the waste is recycled into various energy sources: liquefied gas, liquid fuel and steam. Some of the garbage can be processed into biodiesel, Jet A (aviation fuel for gas turbine engines), diesel fuel, gasoline, kerosene.

Garbage is also processed into products such as compost fertilizer, semi-coke, biochar, tire coal, ferrous and non-ferrous metals, glass.

The system is modular. One pyrolysis reactor requires 10 tons per day of organic waste to be processed. If necessary, you can expand production or move the module(s) to another location.



MWRP-VA can recycle old, already buried waste. Naturally, this will require additional efforts to excavate old landfills and sort, but it is a way to clean up the land and stop further groundwater pollution.

Garbage is collected from sorted and unsorted places and transported to the MWRP-VA facility.

Every garbage that comes in is used, it is classified and sorted.

100% recyclable.

Sorted waste is discharged directly for recycling, unsorted waste is dumped into a hopper that feeds the initial automatic sorting system.

Medical waste arrives in sealed plastic containers and the entire container goes directly to the pyrolysis reactor without going through a sorting system.

The MWRP-VA sorting system requires mechanical sorting, being a set of conveyors with the technology to sort most of the waste. For example, ferrous metals are removed with a magnet. They are then sorted according to the contamination of non-ferrous metals. The automatically sorted waste goes through manual sorting, which gives a large number of jobs. Up to 78% of jobs at the MWRP-VA mill are occupied by unskilled workers.



After sorting, various types of waste are conveyed to a specific place by conveyor. For example, ferrous metals go into a large hopper, which is recycled when filled. Food waste is sent to a bioreactor where it produces compressed gas.

The fuels produced by the system are classified according to the standards required for their application. Depending on the characteristics of the resulting fuel, it can be safely stored in high or low-pressure tanks.



For immediate or future power generation, steam and compressed liquefied gas can be stored in high pressure tanks (CNG)



Gasoline, diesel fuel, etc. can be stored in liquid fuel tanks.

With this system, peak and off-peak energy requirements can be easily met.

The MWRP-VA system is flexible enough to handle almost any type of garbage and waste. It can also be involved in soil remediation (in the event of a fuel spill, the soil can be treated and cleaned up with this system).

In addition to the absence of inert material formation, it is an extremely clean system for air emission standards. Typical venting from reactors is in the form of compressed gas used to process garbage and is similar to venting gas from a gas furnace.

The so-called "inert discharge" is so toxic that Charlotte, North Carolina International Airport turned down a very financially attractive offer to bury inert material under the construction of a new runway at the airport!

Compared to other technologies, the difference is huge!

Below are some examples of the use of processed products:

Biochar (Biochar) - used in agriculture

Using Biochar adds many positive qualities to the soil. It increases yields, in some cases up to 30-40%, especially when used in poor soils. It prevents the fertilizer from leaching out and ensures that it accumulates in a form that is available to plants. With the use of Biochar, it is possible to significantly reduce the load on the soil by reducing the use of mineral fertilizers.

A particularly important property of Biochar is a natural habitat for bacteria and mycorrhiza. In turn, they help plant roots in the absorption of nutrients.

Scientific research has shown that the soil fertilized with Biochar remains fertile for several decades, retaining its properties from year to year.

Unique properties of Biochar

- Increases the porosity of the earth thousands of times
- Increases plant growth rate
- Increases the availability of Ca, Mg, P and K in soil
- Retains soil moisture
- Retains nutrients for the root system. It is an excellent storehouse of macro and microelements
- Stabilizes the soil
- Prevents soil from sticking together into lumps
- Transport path for mycorrhiza and bacteria - accelerates the intake of nutrients by the roots
- Increases the fertility of the land, increases the total biomass
- Stimulates the fixation of symbiotic nitrogen in the root system

Tirechar - recycling used car tires into crumb rubber

- Production of injury-resistant rubber tiles
- Floor coverings for sports fields and facilities
- Filler for bags and punching bags
- Roofing material in the form of combining bitumen with polyurethane
- Structural fiber concrete. Metal and textile cord in a certain proportion is mixed with rubber crumb and added up to 50% to the dry cement-sand mixture
- For road surface - crumb rubber is used in the latest generation of road surfaces

Semi-coke is the main product of the low-temperature Pyrolysis process

- Semi-coke - solid residue up to 90% by weight
- Used as an energy industrial fuel for direct combustion in furnaces of steam boilers or industrial units.
- The most common consumption of lump char
- Due to its characteristics, semi-coke during combustion makes it possible to provide higher temperatures in furnaces with less fuel consumption

Energy source production

- Biodiesel - liquid motor biofuel, mixture of monoalkyl ethers, fatty acids
- Gasoline
- Kerosene - used to produce heat and light
- Bunker oils / fuel oil
- Jet A - aviation fuel for gas turbine engines
- Liquefied gas
- Steam - Steam can be used for the needs of the plant (electricity or heating)

In addition to the above, our system processes glass - transparent and non-ferrous, metals - are separated into ferrous and non-ferrous metals, as well as organic composted fertilizer.

Waste recycling plant MWRP-VA is:

- Environmentally friendly, waste-free, municipal and industrial waste processing
- Generation of electricity in the process of waste processing
- Production of materials as a result of waste processing
- Creation of new jobs (including most of them unskilled!)

By investing in the construction of such waste processing plants, a platform is created to engage the community and empower it

- **Expansion of clean and reliable renewable energy**
- **Reduces toxic waste by addressing environmental, health and sanitation concerns**
- **Sustainable jobs and solid tax bases are created**