



**W2 Energy Inc.**



**Small Electrical Generating Systems  
(SEGS)**



---

## **EXECUTIVE SUMMARY**

W2 Energy Inc. is a growing, publicly traded company (Symbol WWEN) that develops renewable energy technologies and applies it to new generation transportation fuel and electrical power systems. Specifically, W2 Energy Inc. produces Green Energy (Energy derived from not polluting sources or fossil fuels) utilizing its core-patented technologies to produce green energy generating plants and applications. W2 Energy Inc. has seasoned management, cutting edge technology and owns a large technology portfolio of patents and know-how that has been extensively validated and ready for commercial production.

---

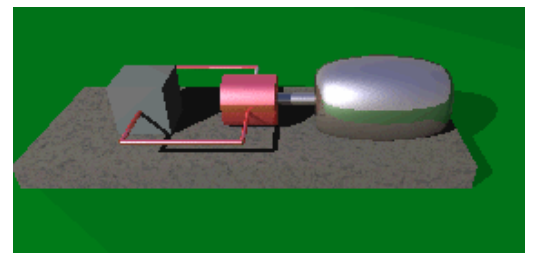
## **THE MISSION**

To be a profitable innovative leader in the discipline of alternative power and alternative fuel technologies and to provide our clients with the most advanced highest quality product for the most competitive cost.

---

## **THE SEGS TECHNOLOGY**

These unique technologies are efficient, economical, and environmentally safe, even for use in the most environmentally sensitive applications such as submerged in rivers or oceans. Existing patents cover these

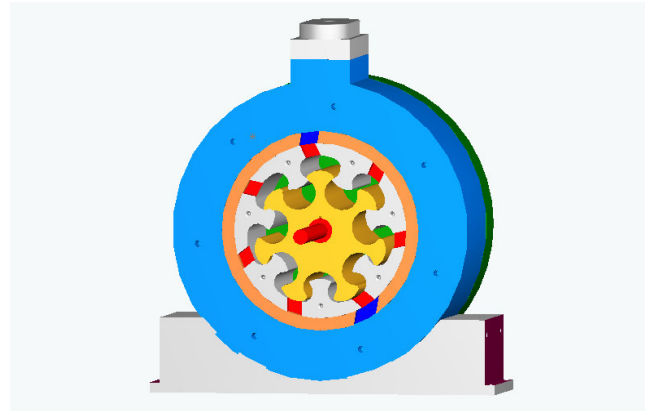


technologies. These technologies are unique and offer very significant advantages. The hydraulic pump/motor will be used in electrical generating systems, which will be installed in locations where there is no chance of freezing temperatures. On the other hand, a rotary pump will be used in electrical generating applications in which freezing temperatures could be encountered. A commercial hydraulic motor will be combined with the rotary pump for incorporation into any of the biomass, wind and hydro generating systems.

The rotary motor, a novel invention, is described in US Patent #4.932.850 "Rotary device having Inner and outer interengaging rotors" dated June 12, 1990. We have modified and improved the original rotor designs as well as built various prototype pumps and motors for testing. We believe that these designs have the following advantages over pumps and motors of similar size:

High volumetric flow efficiency

- Low power input requirement
- Low internal friction and wear
- Low maintenance
- Relatively leak free (no drain required)
- Compact
- Variable displacement
- Variable operating speed
- Quiet
- Easily scaleable

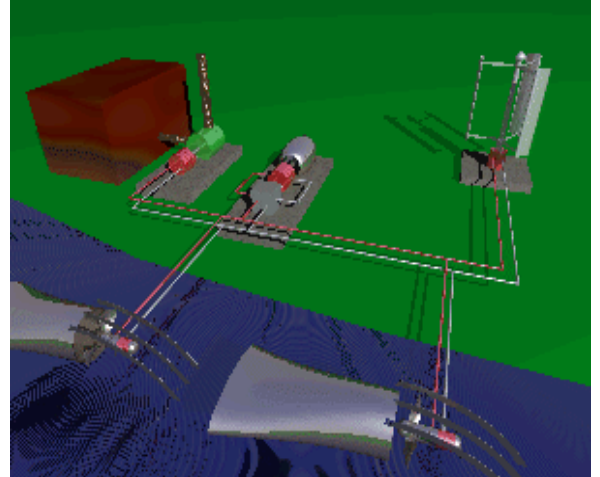


This hydraulic pump technology is especially unique as it eliminates the need for, and the hazards of, oil as a lubricant. All other pumps rely on petroleum products for lubrication and/or transmission. The complete absence of potentially harmful petroleum products makes the technology ideal for installations in even the most environmentally sensitive locations.

The technologies explained above will be combined to create a biomass, wind and hydro mini-electrical power generation system.

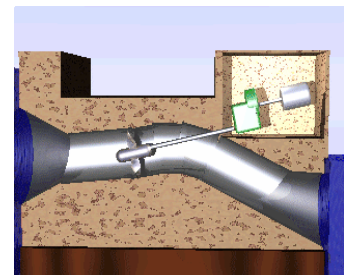
SEGS generating systems consist of four primary components:

1. Runner (i.e. rotor/propeller) harnessing the power source
2. Hydraulic pump
3. Hydraulic motor
4. Generator



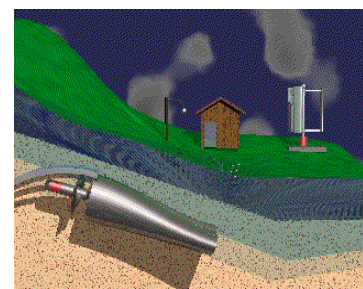
Existing Micro-Hydro generation systems suffer from a number of limitations, which the SEGS technology addresses:

**Environmental** - current systems require the use of a dam and penstock, which can interfere with the environment and be an eyesore. In contrast, the SEGS turbine and hydraulic pump are submerged directly in the riverbed and thus the natural beauty and environment are not impacted.



Traditional dams

**Scale up** - current systems are difficult to scale up, requiring multiple penstocks and replicating major components of the system. In many cases they are not appropriate for communities. In contrast, the SEGS units are larger and can be scaled by increasing the pump size, turbine size or number of turbines.



SEGS approach

**Restricted access** - current systems require that the turbine shaft be directly connected to the electrical generator. However, in many co-generation applications, there simply is no room to allow such a system. Thus there is the need to de-couple the electrical generator from the turbine. The SEGS uses a hydraulic transmission/coupler so that the turbine can be placed down a shaft (or submerged) and the electrical generator located more conveniently.

**Control systems** - There is limited ability for current systems to adjust to electrical load variations, seasonal flows and river heights or variations in wastewater flow rate. Often a mechanical device is used to restrict the flow of water through the penstock, which results in rising river levels or wastewater backpressure. In contrast, the SEGS hydraulic system can be used as a transmission to control the motor shaft speed regardless of the turbine shaft speed (within certain limits).

**Head and Flow Requirements** – existing units often require large heads of at least 50 feet. In contrast, the SEGS unit was designed for larger diameter turbines and heads of under 10 feet with moderate flow. Our high efficiency, low flow pump enables hydroelectric generation from a new spectrum of water sources, wind sources, and tidal streams.



---

## INNOVATIONS

The functionality of patented V70 and V90 pump and motor provides the users with the capability to design small power systems that improve the performance of the system. This is accomplished by allowing three key components: the ability to decouple the generator from the turbine the ability to scale the system easily and the ability to hydraulically gear the system

The first differentiator is the ability to decouple the generator from the turbine is a novel approach; current systems require that the turbine shaft be directly connected to the electrical generator. However, in many co-generation applications, there simply is no room to allow such a system. Thus there is the need to de-couple the electrical generator from the turbine. The SEGS uses a hydraulic transmission/coupler so that the turbine can be placed down a shaft (or submerged) and the electrical generator located more conveniently.

The second differentiator is the current systems are difficult to scale up, requiring the replication of major components of the system. In many cases they are not appropriate for communities. In contrast, increasing the pump size, turbine size or number of turbines can scale the SEGS units.

The third differentiator is the ability to hydraulically gear the system. This is particularly useful with application which under traditional systems would only be able to product a limited amount of power due to low head, flow, limited access or in the case of wind power limited wind source. The system can be scaled in a manner as to have a larger pump and a smaller capacity motor, which would allow for a gear ratio directly corresponding to the difference in size of the pump and motor.

Focusing specifically on the hydro facet of the system, the SEGS hydro module is configured for two climactic conditions: freezing and non-freezing climates.

Two types of mini-Hydro electrical generating systems will be produced:

- submerged systems for rapids and tidal streams
- systems for existing mill and storage dams.

All W2 Energy Inc. mini-Hydro generating systems will be able to work with the company's GAT biomass to syn-gas reactors and wind-powered electrical generating systems.