

## **Free-flow hydro powered multi turbine set with overlapping rotors system**

The present invention relates to an off shore Hydro Power Plant for generating electricity, and more particularly to the described means for extracting kinetic energy from ocean currents. The surrounding ocean waters are an eternal kinetic energy pool. Acting as the prime mover, these waters and the accompanying ocean currents are always ready to power the high performance multi turbine set with overlapping rotors and in turn the generators which produce electrical current in this embodiment.

Ocean currents are moving bodies (rivers) of water. This enablement extracts/converts the kinetic energy derived from ocean currents and mass (weight) at a depth to its best form, electricity.

This invention is best compared with existing hydro-electric power dams which produce currents at a lower unit cost than land based fossil fuel fired power generators.

The enablement relates to a completely enclosed electrical power generation plant, standing alone as a structure, on a station opposing a constantly flowing ocean stream of kinetic energy. The force of this moving mass is the prime mover to drive one or more multi turbine set with overlapping rotors to generate a nearly infinite amount of low cost electrical power or for other useful purposes. This stream of water flowing through the enclosed power plant can be turned on or off, as if it were a water faucet in a kitchen. The ocean, is the reservoir of this infinite body of free flowing kinetic energy, and only requires this faucet to be turned on to be a prime mover. There is not a single moving part between the ocean reservoir and the cutoff valve on the power plant operating floor. This method, as an operative means is simple, elegant and profound in its ramifications.

Hydrospace Off shore Sites: Ocean Currents & Winds as Kinetic Energy Pools.

(a) These rivers of seawater and atmospheric air are open channel flows of matter which observe the natural laws of physics. Both are fluids, water being non-compressible, atmospheric air being compressible.

(b) The best existing technologies, as means to extract energy include:

(1) Giant wind driven multi turbine set with overlapping rotors /generators sitting atop pylons anchored on the sea floor. These may include an array of these multi turbine set with overlapping rotors which are situated over a large

area and are often described as wind farms. The wind velocity (speed) encounters the multi turbine set with overlapping rotors blades as a resisting surface and in turn cause said blades to rotate and drive a generator of electricity. The weather at the moment determines the wind speed as a useful force. This force is what acts upon the multi turbine set with overlapping rotors to effect rotation torque.

What force comes by is what is available to do useful work. There is no acceleration by reason of the hydraulic dynamics provided by a closed circuit, as in the case of this embodiment.

(2) Underwater multi turbine set with overlapping rotors /generators of electricity literally swim within the ocean current (river) in multiple numbers, over an extended area, each one being attached to the sea floor. As is the case for the windmill multi turbine set with overlapping rotors s, the flowing stream encounters the blades in response to the applied force. The sea water currents are more or less running at a constant speed or velocity and temperature over time. In the case of these devices, what flows by is what acts upon the multi turbine set with overlapping rotors blades to provide torque to generate electricity. There is no acceleration by reason of the hydraulic dynamics provided by a closed circuit.

(3) My invention, in its best use embodiment ( Multi turbine set with overlapping rotors ) and its alternative embodiment as a supercharged atmospheric air flow, introduces the flows of kinetic energy into, through and out of a conduit system that accelerates and regulates both velocity and volumes. Cones/frustums having the shape of nozzles accelerate the flow, whatever enters in one second goes out the exit point at one second, as a net force, unless the conduit includes a cutoff valve as a means to bring it to a complete stop when closed.

### Extracting Energies from Hydrospace/Atmosphere

In a larger sense the field of my invention is the physical and environmental character of the location, the infrastructure needed to support the distribution of energy products, and the interplay of multiple governmental and private interests as a developmental and operating project. The technology disclosed by my invention, as a means to extract an almost infinite energy source is one thing. To bring it into an operating reality is quite another. This can be brought into fruition in the following manner:

(a) Development on the scale that can assure effective use of my invention's technology and to bring it on line requires a massive capital expenditure. The first act must involve off-shore surveys of practical sites followed by conceptual development of power plant facilities and up link output distribution to on-shore grid connections to private regional power producers. The planners should be private producer operators of power plant systems or governmental agencies such as the Tennessee Valley Authority or other such agencies. The off shore sites are government property, to be leased under development/operating permits. The sites are both federal and state owned along seashores having ocean streams, such as the Gulf Stream. These are infinite pools of kinetic energy.

## BACKGROUND OF THE INVENTION

Our Earth is a water planet. Within the oceans are moving masses of energy as ocean spanning currents with crushing pressure, due to depth. If this energy could be mastered, the benefits are incalculable. These renewable energy sources are powerful beyond belief and will be with us long as the Earth exists.

Winds of high constancy blow with great regularity over the ocean. Those winds, along with the salinity balance of the ocean, have the effect of producing currents which are effectively, rivers at sea. The northwest and southeast trade winds of the two hemispheres are the mainsprings of the ocean's surface current circulation. In the Atlantic and Pacific oceans, the two trade winds drive an immense body of water westward over a width of some 50 degrees of latitude, broken only by the narrow belt of the east-going equatorial counter-current, which is found a few degrees north of the equator.

Currents of over 3.5 mph are confined to very restricted regions. The Gulf Stream flows at a substantial speed for some 400 miles. It hits peak velocity off Miami, where it is about 45 miles wide and 1,500 feet deep. There, the current has reached a speed of as much as 7.75 mph in its narrow central axis. Although the peak current velocity of the Gulf Stream may at times, exceed 7 mph in its narrow axis off of Miami, the most likely velocities for those multi turbine set with overlapping rotors s placed in its central axis would be between 4.75 and 6 mph. Ocean Passages of the World (published by the Hydrographic Department of the British Admiralty, 1950), lists 14 ocean currents that exceed 3 knots (3.45 mph), many of which are in the open ocean. Any of these currents would provide a suitable placement for this enablement.

The present conventional method of generating power is the hydro-electric generating dam, which has been around for well over a century, without any major conceptual breakthroughs. At this time, 20 percent of the world's electricity is generated by surface water dropping in elevation and flowing through multi turbine set with overlapping rotors to produce hydro-electric power.

From the force of falling water, a multi turbine set with overlapping rotors of conventional hydro-electric dams generates energy in the following manner:

- a. A flowing source of water down-hill from a gravitational pull or from natural forces as currents, which flow into a multi turbine set with overlapping rotors ;
- b. Water strikes and turns the blades of a multi turbine set with overlapping rotors which rotates the shaft of a power generator;
- c. The shaft rotation through the generator creates a flow of electrons as an electrical current;

The electrical current is processed through a transformer to produce a voltage suitable for transmission onward;

The water is discharged as spent water flow;

However, based upon current technology, hydro-electric dams are enormously costly to build and there are many additional obstacles preventing the successful use of impounded water for hydroelectric purposes include the following:

Damming of the flowing water is prohibitively expensive;

(b) It is often impossible to locate in a particular location because of soil conditions;

(c) It may be impossible to locate because of geographic conditions;

(d) It may be impracticable because of navigational needs for the flowing water;

(e) Deep layers of alluvial soil overlaying impossibly deep bedrock, may make construction of foundations for dams totally impractical;

(f) Broad flat valleys, such that small rises in water level would inundate huge acreages of valuable land, and small drops in water level would lay bare large areas of mud flats;

(g) Related to the above, lack of nearby mountain ridges between which dams could be built may prevent their construction.

## BRIEF SUMMARY OF THE INVENTION

The present invention avoids all of the above problems of constructing additional land based systems. There is no practical limit on the number of these generating plants which can be operated in ocean currents around the Earth. No water is consumed. Instead, it merely passes through this enablement, moving the multi turbine set with overlapping rotors and generating electricity in the process. This is an unlimited energy source for mankind for as long as the World exists.

This enablement relies on (1) the incompressibility of water and its mechanical properties, and (2) natural forces that assure the intake of water into the Penstock leading to the Pelton impulse multi turbine set with overlapping rotors and (3) the motive force of a free flowing stream moving through a Jet Pump conduit which intakes the flow from the ocean stream, accelerates its velocity, supplies the Penstock conduit and moves the system's combined flow onward as an exhausting function to the downstream ocean current.

This system transforms kinetic energy into mechanical energy by rotating an impulse wheel multi turbine set with overlapping rotors , which in turns rotates the shaft of a generator. Mechanical energy is the link, which applies hydraulic energy to a generator workload and causes a flow of electrons. The result is the flow of electrons by extraction from eternally flowing ocean currents.

This enablement is the marine version of land based, gravity fed hydro-electric power plants, but it also is evolutionarily related to the river multi turbine set with overlapping rotors line of inventions that have sought to harness currents in rivers throughout the world.

Many efforts were made in the late 1800's and early 1900's to harness the flowing currents of rivers without using dams. These river current motors were supposed by their inventors to recover energy from the velocity of the moving currents of water, and to convert this energy to some other more useful form. The driving of a generator of electricity was one commonly envisioned form.

The multi turbine set with overlapping rotors and electricity generator and ancillary items are commercially available items, either as production or as custom designed facility installations. Multi turbine set with overlapping rotors comes in many sizes and variations. The largest one, with its electricity generating capacity, was said to produce 800 Mega watts.

Every kilowatt-hour of electricity that is generated by water, wind, and other renewable-energy sources can replace the same unit of electricity that is presently being generated by burning fossil fuels.

In summary, this enablement has a constantly flowing water supply as a prime mover (W1) and consumes no matter, as it transforms energy from an infinite renewable source. It is readily replicated and produced for volume energy needs. This invention ensures a relatively inexpensive method of producing energy, without consuming any fuel or non-renewable resource, in a completely environmentally friendly manner. These are its principal advantages over other fossil-based systems in present use. This enablement is a new Paradigm which utilizes natural forces of the universe to bring a new method of energy generation to the World for all of its many uses.

#### DISCUSSION OF PRIOR ART

The prior art discloses devices that are submerged in a body of water and operated as specific integrated apparatus, said objects being for the purpose of transforming kinetic energy to a form useable for beneficial purposes. These objects are not comparable to our enablement as to their physical configuration, their operative devices or the means used to harness the stream's kinetic energy as a prime mover of devices, which are the integral parts of such art utilized in this enablement.

[0035] Man has always seen moving water as a means to do beneficial work. Rivers flow, as do ocean currents. Any object placed in its way of passage is acted upon in some way. The object of my invention and those of Herschel (U.S. Pat. No. 873,435) and Mouton (U.S. Pat. No. 3,986,787) is to change hydraulic energy to mechanical energy and then to electrical energy, at the highest rate of exchange, This object being satisfactorily accomplished, all other aspects such as structure, process and location follow in a similar form as is followed in these two other inventions

This invention does not create a vacuum by way of any induction action such as occurs when one stream of fluid flows against another, but accomplishes its objective by utilizing the negative pressure produced by the flow of water through an expanding conduit, with a considerable velocity head and at a low static head. The low efficiency of ejector devices, operated by the induction of one stream flowing against another, rendered them unsuitable in Mouton's design, for the discharge side for the purpose of increasing the power thereof

The multi turbine set with overlapping rotors , used in my invention, along with its direct drive generator and associated equipment, is commercially available, with either production or custom designed total systems adapted to the marine environment.

The diameters of the multi turbine set with overlapping rotors are limiting factors, so multiple units would have to be deployed over a large area to come anywhere near the capacity that an array of this enablement would produce. By contrast, the conventional style power plant features of my invention have an unlimited potential for volume energy output by manipulating its velocity and mass to control any desired output.

Unlike the cited patents, this enablement consists of a structure within the ocean / river allowing a flowing ocean stream to flow through a conduit system. Most of my invention is located under water tight housing unit with the most essential components located on a wheel pit floor inside the building, to protect it from the elements and to facilitate ease of maintenance;

d. Unlike the cited patents, this enablement features an open-close valve, that when open, allows the flowing pressurize stream to flow into the Multi turbine set with overlapping rotors component inside the water-tight structure;

The advantage that this enablement has over all of the above referenced patents and those of a similar nature relates to the fact that this enablement is a hybrid, utilizing the best and most effective features of both a hydro-powered dam and a river multi turbine set with overlapping rotors , both of which have a long history of successful operation, in an ocean or river environment. It is remarkable for its simplicity and expansion potential.

**See video of invented hydrokinetic turbo set in under water operation at:**  
<https://www.youtube.com/watch?v=bfNk3llq0wk>