

REPLACING OF NUCLEAR POWER PLANTS WITH RENEWABLE ENERGY SOURCES

Have you ever stood on the river coast, watching unbelievable quantities of water flowing near you every second, each minute, in hours, days, months and years? Can you imagine how much power we would need to stop this water moving, or how much energy we would need to move such water quantity by machine power?

As the first, let us check if slow river flows have enough of power and what is a volume of it. All following numbers belongs to known and “traditional” Physics:

Energy Density of Flowing Water - the water is treated as incompressible medium - has in Hydrodynamics very well known formula: EDFW (kW/m^2) = $0.5 \times v^3$. Regarding that, every square meter of cute section of river flow carries a power of:

6,8 kW – by water stream speed 2,5 m/second
13,5 kW – by water stream speed 3 m/second
21,4 kW – by water stream speed 3,5 m/second
32 kW – by water stream speed 4 m/second

Practically it means that in medium large river, with cross section of 75 meters and water depth of 3,5 meter, in any place of its cut area it is available for “capturing”:

1,78 MW of power by water stream speed 2,5 m/second
3,41 MW of power by water stream speed 3 m/second
5,61 MW of power by water stream speed 3,5 m/second
8,40 MW of power by water stream speed 4 m/second

Simple speaking, inside of slow water streams is more than enough of power but traditionally known sources for “capturing” of that power are completely inconvenient. For example, Windmill propeller immersed in the water stream is total “joke” regarding Hydrodynamics because of more reasons:

- It needs very deep water (15 to 35 meters),
- Back sides of such propellers is acting like a “brake” against rotation,
- Very high design needs extremely strong and expensive fundament,
- Vertically placed turbine uses very short time of “touch” of the same molecules of water to turbine wings and in the meantime, (between the wings), more than 15 times larger quantity of water remains unexploited and out of any use,
- The circular shape of Windmill propeller is definitely not offering any serious possibility to exploit energy from larger percent of river stream (cut) surface.

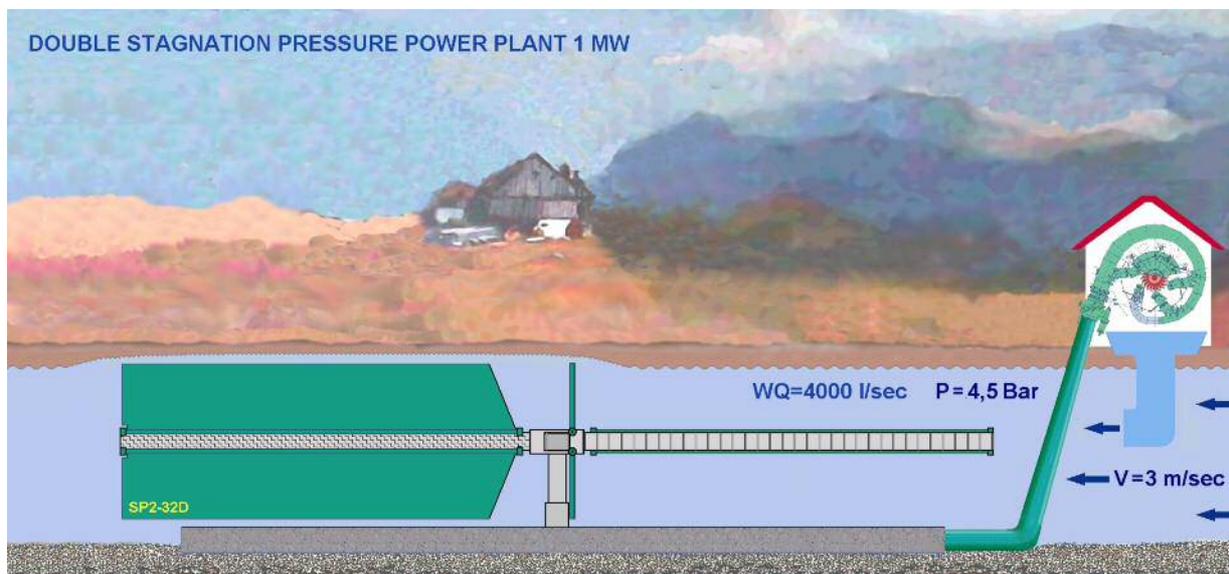
It seems to be that huge amounts of energy which causes slowly movements of water masses we could not use – at least not with high efficiency. This is forcing us to build expensive and ecologically always very delicate dams and artificial lakes. So, the only solution was to design **completely new type of power turbines**, able to extract energy from slow moving water streams. After many years of experiments and development the SP turbines (Stagnation pressure turbines) were designed. On this project I have been working nearly 20 years (<http://www.izumi.si>).

Up to last year I used to develop only smaller units (SP 1) with Power up to 80 kW, but now days I am working with new designs (SP 2) with 10 or more times larger power.

SP 2 units are extremely cheap, technically simple and designed to operate in river or sea streams with life time - longer than 50 years. The units are placed on the bottom of the river or Sea, they are only 3 m high (instead of 15 to 30 m by known TIDAL units), but their horizontal diameter is very large because SP2 are propelled on radial way and not like other TIDAL turbines which are axially propelled. Therefore, apart from smaller units for river streams, I made calculations and plans for more of SP 2 units (operating like presented on my brochure "HOW TO STOP CLIMATE CHANGES) with 22 and 32 meters of diameter – very convenient to be used in larger rivers or as TIDAL units:

SP 22 (1 single turbine); 300 kW of Power; costs 1 Million EUR; price for kWh - 0,018 EUR
SP 32 (1 single turbine); 500 kW of Power; costs 1,2 Million EUR; price for kWh - 0,020 EUR
SP 32 (2 single turbines); 1 MW of Power; costs 1,7 Million EUR; price for kWh - 0,024 EUR
SP 32 (1 double turbine); 1 MW of Power; costs 1,5 Million EUR; price for kWh - 0,022 EUR
SP 32 (4 double turbines); 4 MW of Power; costs 7 Million EUR; price for kWh - 0,021 EUR

In all described cases the Power generators are placed on the coast. Simply speaking, high tension electricity do not belongs in to deep water.



As an example, let us mention an interesting possibility: After the nuclear accident in Japan, Germany has decided to shut down all Nuclear Power plants which today produce nearly 13 GW of their power. All these plants are (due to cooling needs) always placed near by bigger rivers. So, if near any power plant of ca. 1 GW of Power, on the bottom of a nearby stream in three or four columns and in river length of ca. 10 to 17 km we place the required number of double SP 2 devices (number depends from local stream speed) and underwater pipeline system to deliver pressurized water to Power

Plant, with replacement of steam turbines with water turbines, the entire infrastructure of Power Plant (which includes 50% of total costs) can remain in function. At the same time we can remove all radioactive and environmentally destructive and even dangerous elements and after that, we can acquire substantially cheaper electricity.

Total costs of such installation would not exceed the sum of 800.000 EUR per MW of gained Power - what is much less than the price of conventional construction of hydroelectric Power plants, which (due to the configuration of the land and required huge lakes and dams) on the most of those locations could not be build.

I believe that my last Patent application of SP2 system (with“ LADLE HANDS” pumping system) which was locally applied as P201300018 at 25th of January 2013 (it is not published yet and I intend to protect it by PCT before expiring 1 year of grace period), is the most important invention referring Renewable energy sources in our days. It is offering cheaper electric power than classic Hydro Power Plants (but without dams and artificial lakes) is for 40 to 70 TIMES cheaper than Photovoltaic or Windmill installations by investments and nearly with the same relation - for worldwide lowest price for each received MWh of electricity.

Please, visit my Home page, see movies, pictures and physical explanations - why new turbines are so efficient, see my previous and the last SP Patents and let me know if you are interested in to make serious activities to license it or to buy it. Of course, at the first place I prefer just Joint Venture deal. In Licensing version price depends from territory (50.000 € to 4,000.000 € + 4% of license royalties). For Patent sale, price is depending from territory for exclusive protection and can vary between 100.000 € (for single and smallest market) up to approximately 16,000.000 € for World exclusive rights. Combination between License contract, Patent sale contract and Joint Venture deal are also possible.

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