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# Pressurized Domestic Hydraulic System, Producer of Hydroelectric Energy

Luigi Antonio Pezone

*Abstract -* The invention of pump with dual supply until to the impeller has allowed developing different ways to produce hydroelectric energy with water recycling. But those which guarantee the best performance with reduced dimensions are those which use pressurized water tanks with compressed air. In fact, in the case of a hydraulic system with pressurized autoclave (1), we can not use the energy of the water surface position of an open basin, which produces kinetic energy in the descending pipe which feeds the pump and turbine, but we can exploit the compressed air pressure that pushes the pressurized water directly in a turbine or a pump used as a turbine (2) and discharging in a reservoir at atmospheric pressure (3). In this case, we exploit the pressure drop and the flow rate through the turbine, while the pump with double separate supply until to the impeller, immediately re-inserting the water in the pressurized tank (1), from the suction side of one of the two feeding inlets , and by recycling simultaneously with the other feed the pressurized water inside the tank, allows to maintain constant the water level, saving the energy that would be necessary for the restoration of the pressure of the air cushion, and that to win the hydrostatic pressure, consuming only the energy required for water circulation within the accumulated volume of water. The energy sources of this plant are the compressibility of the air and the non-compressibility of water. Pairing two identical systems, one for hot water and one for cold water, in our homes we can produce energy for twenty-four hours a day and three hundred sixty-five days per year, distributing the hot or cold water to the heating system, cooling and services, but without gas boilers and even solar panels, in part by reducing energy production only in the pickup phase of water consumption and for heating or cooling of the apartment. The energy produced by pressurized domestic hydroelectric plants will be about ten times greater than that absorbed for water circulation, also improving water quality, due to oxygen that is dissolved in it.

## I. Description

In the introduction of any patent filing is standard practice to cite the state of the sector concerned. But in this case there is not much to say because the hydroelectric pressurized does not exist. This is the real situation, which penalized the environment and the world economy, since it is a clean energy system, not bulky economic, which has the capacity of continuous production, and greatly superior to the existing energy yields.

In this system it is important above all the combined use of the compressed air and the modified pumps to circumvent the pressure of the air cushion in the phase of recovery of the water, exploiting instead the same pressure at the outlet of the tank, saving and producing energy.

In fact, the current autoclaves used in water systems only reduce the phenomena of unsteady flow perturbations and the number of starts of the electric pumps, avoiding overheating of the motors. Now the autoclaves are inserted in parallel to the normal water flow, while the air cushion, expanding and compressing, allows the entry and exit of water, reducing the pressure peaks and providing water to the network for compensating for small pressure drops through the same outlet hole.

In pressurized hydroelectric, instead, we exploit otherwise the physical principles of water and air, because the pressurized tank is inserted in series in the water flow, which is one-way. The water enters at the bottom of the pressurized and exits laterally while the air cushion tank exerts pressure on the water surface but does not let expand, since the studied circuit is designed so that the water that enters is perfectly equal to that coming out. In fact it is much cheaper to circulate the incompressible water to keep constant the pressure that allow expansion of the volume of air and then compress it again, creating a discontinuous and with low performance system. On the other hand also the atmospheric pressure is a pressure that acts on all the water surfaces of the planet without expanding. but its effects are felt on the physical, chemical and biological. Atmospheric disturbances that occur within the atmosphere produce disasters and global well-being. Instead, the pressurized hydropower, when it is understood, will represent one of the most important inventions of man and economically sustainable, only creating overall wellness, but locally producing chemical and biological effects that contribute to the depuration and as we shall see, even the reduction of CO2 from the atmosphere, counterbalancing the disasters produced by the thermal energy.

This invention, as some previous inventions of the subscribed, related to energy production with recycling water, it would not be possible without the invention of the pumps with double separate power supply until to the impeller, which as shown in Fig. 1 and 2, allows to circumvent the hydrostatic pressure of the pressurized tank dividing the water flow at the pump inlet in two or four sectors kept separate until the entry of the pump impeller. These sectors, are separately fed with water taken from the pressurized tank and the water

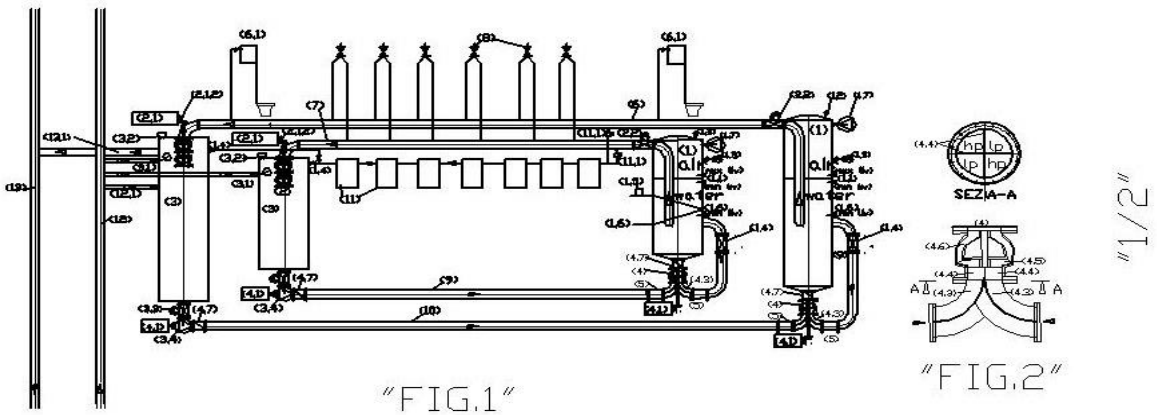
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to be introduced in the same pressurized tank, so as to recycle about 50% of the total flow that circulates in the tank. Since the fixed power supplies, while the impeller is rotating, the same sector of the impeller is alternately fed with a stream having a different pressure and very similar flow rates, therefore, the flow of water with increased pressure pushes the impeller in the flow of water with pressure minor, which comes from outside the tank (1), while the rotation of the impeller, further increases the water pressure, overcoming the load losses in the pump, valves and special pieces that make up the circuit.

Substantially, in hydroelectric pressurized, the greater energy source is the compressed air cushion imprisoned above output water of the tank, that is consumed only minimally due to the laws of Dalton and Henry, while the water circulates with a very low prevalence of the pumps and with very little energy expenditure by electrical motors, due to the cooperation of the maximum hydrostatic pressure flow specifically carried on the suction side of the pump with the dual separate power supply until to the impeller, and due to the principle of Pascal, that allows the expansion of the total pressure in the body of the pump and the outlet there of.




"FIG.1" "FIG.2"

The Fig. 1 and 2 of the drawing 1/2, reported respectively the hydraulic scheme and the pump with the double separate power supply until to the impeller, the hydroelectric plant pressurized domestic, of which shows the legend:

(1) autoclave pressurized tank; (1.1) level regulator with capacitive probes; (1.2) safety valve; (1.3) manometer with shut-off valve; (1.4) motorized valve flow control with position transmitter; (1.5) pressure flow transmitter; (2) pump used as a turbine (pat); (2.1) alternating current generator; (2.1.2) coupling at an angle alternator turbine; (2.2) motorized valve to supply turbine with flow adjustment; (3) water transit tank at atmospheric pressure and containment pat; (3.1) motorized valve to feed pressurized water network; (3.2) motorized valve bypass supply at low pressure; (3.3) air valves; (3.4) feed electric pump in low pressure variable speed, driven by an inverter (4); electric dual supply pump on the suction side; (4.1) pump drive motor, with variable speed, controlled by an inverter; (4.2) joint pump motor coupling; (4.3) double curve with septa crossed separators in low pressure; (4.4) septa to flow separators; (4.5) closed impeller; (4.6) diffuser of the pump; (4.7 check valve; (5) flow diverter stub pipe; (6) cold water supply collector; (6.1) water supply to wc; (7) hot water supply collector; (8) hot and cold water mixer valve with its connections to the collectors (9) return collector of hot water; 10) return collector ofcold water; (11) heating and cooling House plant; (11.1) pressure regulator with shut-off valve and pressure gauge; (12) condominium water distribution network; (12.1) Additional cold water supply with solenoid valve; (13) piping of water collection and discharge in the low-enthalpy geothermal well; (13.1) overflow drain for water cooling in the geothermal well;

This system includes an electrical control panel with inverter for the regulation of flow of the electric pumps and of the adjustment of the degree of opening of the motorized valves as a function of the level control (1.1) of pressurized tanks and the gauge pressure of the air cushion and to connection with national energy operators for absorbing the energy of the departure station and the produced energy return.

As can be seen from Fig. 1, "pressurized domestic hydraulic system, producer of hydroelectric energy" is composed of two parallel hydraulic plants, very similar to each other, which replace the existing water and cold water distribution and hot and heating systems. But these systems, in addition to using the water for domestic use, produced by the pressurized circulation of the same, even the electricity that serves the entire apartment, making it independent from the electricity network, in fact, providing the public network the energy produced in excess, since more than three



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KWh products for 24 hours a day and 365 days a year for all the housing will consume only a small part.

In fact, in the years 2008 - 2009, according to a report of ENEA, the average annual energy consumption of Italian families was 2442 KWh (http://kilowattene.enea.it/KiloWattene-consumi-fami glie .html), with an average of 0,278 kWh. However in order to cope with absorption peaks the maximum power used for each electricity meter is commonly been established in 3 KW.

This means that if all families would produce at home, in the plants in question the three KWh necessary absorption of three KW peak, over 90% of this energy would be used by the public network. Users, instead of being consumers of energy, would become producers of clean energy on behalf of the national energy managers, eliminating the existing thermal power plants that produce energy using fossil fuels and emitting CO2 into the environment.

To get technical details that describe the hydraulic systems that can produce this energy and environmental miracle, you need to see from the diagram in Fig. 1, that the two systems side by side, can be accommodated with the tanks on an outer wall of the apartment, with the outlet collectors (6 and 7) that enter inside the apartment, above the doors of rooms and return collectors ( 9 and 10) which remain outside the apartment, in the floor below the compartment of the door passage.

These two parallel installations are constituted essentially by a tank (1) pressurized with the compressed air produced by a compressor mini (1.7) and from the collectors (6 and 7) which by means of a motorized valve (2.2) feeding a hydraulic turbine (2) which discharges the water in a reservoir at atmospheric pressure (3), from which the water, by means a valve (3.3) a circulation pump (3.4) and the collectors (9 and 10) returns to the pump with the dual separate supply ( 4), that reintroduces in his own impeller, which recycles also at the same time the water of the pressurized tank (1). As can be seen from the figure, the apartment water utilities are fed by pressurized collectors (6 and 7) before these feed into the turbines. Since the flow rate of water required for production of energy is about five times higher water withdraw able from the utilities and by heating or conditioning systems, there is a small reduction of the energy produced by the turbines only during the levies.

As seen in the diagram, the load is supplied from condominium water supply (12) that connects to the float valves (3.1) of the atmospheric pressure tanks (3). It can be noticed that the tanks (3) also collect the hot water heating plant and the cold cooling water, which circulates in the summer period in the same radiant elements. In fact, to use this system, the water of the heating and cooling systems cannot circulate in a closed cycle, as in the existing systems, but is always renewed with the water of the condominium network (12). In particular, it can be noted that the tank of cold water recovery (3) is provided with an additional water supply (12.1) and the overflow drain (13.1) to increase the flow of water during such use. It 'well known fact, that the circulating water in a geothermal well exchanges heat with the subsoil that is located at a constant average temperature during the whole year (12 -15 oC).

We do not enter into the merits of the type of heating, and cooling that can be with radiators, fan coils, or with heated floor, but it is noted that the heating water temperature must be the same of domestic hot water, being the system in common. Therefore, the calculations of the heating elements must berealized in function of this temperature (approximately 50 °C). While, for cooling, which requires a higher water circulation, is possible to increase it by means of supplementary feeding with the solenoid valve (12.1) which renews the water in the cold water circuit, draining part from the overflow (13.1) of the tank (3), replacing it with cooler water raised by the low enthalpy geodetic well (drawing 2/2). In fact, in the well do pass the water that comes from the public aqueduct, which is raised to the condominium water network by means of a pressurized hydroelectric plant with water oxygenation, specially designed for wells, of which only for information, I describe later the drawing 2/2 with legend and description (being the object of another patent of the undersigned). This, to highlight that state of the art in the field of energy efficiency, management of water resources and water and air purification, can make a remarkable leap forward in all urban centers of the world, completely eliminating energy fossil with very low cost, without the clutter that requires solar energy, and eliminating the millions of external units of air conditioners, which help spread dust and heat the ambient of urban centers. In fact, the geothermal well, will play five functions: heat exchange with the subsoil, storage of drinking water, oxidation and lifting of the same and energy production, not taking the ground water, but the of the aqueduct. The water level in the well is always maintained at the nominal level through feeding from the public water network (18) of drawing 2/2, by means of a solenoid valve subservient to a minimum level probe. To increase the coefficient of heat exchange with the subsoil is advisable to realize the well with pipes coated in ceramic stoneware.

In hydraulic systems that produce energy inside the apartments, contrary to existing autoclave systems, pumps and turbines are always in operation (having to produce energy), while the variable speed motors and valves regulate the flow rate, if you want to adjust also the amount of energy produced. The electric pumps of low pressure circulation (3.4), feed the entrances of the left (looking at the drawing) of double pumps with



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separate power supply until to the impeller (4), while the second entrances are directly fed with the maximum pressure of the pressurized tanks (1). The pressurization with compressed air is provided by a mini compressor (1.7), of the type used for the inflation of car wheels, These tiny compressors powered at 12 V c c, are sufficient, since very little compressed air that is consumed. The only differences between the hot and cold water system are the slightly higher volume of water to that in which circulates the cold water to cope with the increased daily water consumption. While in the pressurized tank in which circulates the hot water it is incorporated electrical resistance (1.6) for heating the water.

When occurs the levy of consumption of water through the mixers faucets of hot and cold water (8), the discharge of the toilet, etc., there is a level drop in the reservoirs (1 and 3), which is immediately restored by entering water in the supply circuit of the tanks (3), via the supply valve float (3.1) fromthe communal network (12). Come si può notare dallo schema, l'aria compressa è imprigionata nella zona superiore dei serbatoi pressurizzati (1), pertanto non può uscire dal serbatoio e non si consuma, a parte quella che si solubilizza nell'acqua per effetto della maggiore pressione nel serbatoio (4 bar) e che l'acqua libera nell'atmosfera quando è scaricata nel serbatoio (3), ma questo fenomeno è quantificabile in milligrammi di gas per litro di acqua (azoto, ossigeno, CO2) secondo la legge di Dalton di cui si riportano di seguito le formule principali che spiegano anche i concetti, senza entrare nel merito dei calcoli:

In a mixture of ideal gases contained in a volume V and the temperature T, the molecules of each gas molecules behave independently from the other gases; as a consequence of this is that the pressure exerted by the gaseous mixture on the walls of the container and on the water surface is given by:

$$p = \frac{RT}{V}\sum_i \eta_i$$

where, R is a constant that that is 0,0821; , … represent the number of moles of each component of the mixture. This law is valid under the conditions by which it is valid the ideal gas law is approximated at moderate pressures, but becomes more and more accurate as the pressure is lowered. By defining the molar fraction as the ratio between the number of moles of the ith component and the number $\sum \eta_i$

Total of moles present: $x_i = \frac{\eta_i^i}{\sum_i \eta_i}$

It is obtained that in a mixture of ideal gases, the partial pressure of each component is given by the total pressure multiplied by the mole fraction of that component:

$$p_i = \eta_i \frac{p}{\sum \eta} = r_i p \,.$$

According to Dalton's law, the sum of the corresponding partial pressures must be equal to atmospheric pressure (1 atm = 101.3 kPa) and in fact: Nitrogen: 79.014 kPa; Oxygen: 21.232 kPa; Carbon dioxide: 0.04 kPa; Argon: 0.8104 kPa; other gases: 0.2127 kPa. Total (air): 101.3 kPa.

The Henry's law says that at constant temperature, the solubility of a gas is directly proportional to the pressure that the gas exerts on the solution. Reached equilibrium, the liquid is defined saturated with the gas at that pressure. This state of equilibrium is maintained until when the external pressure of the gas will stay the same, otherwise, if it increases, more gas will enter into solution; if it decreases, the liquid will be in a situation of super saturation and the gas is freed back up to the outside when the pressures are again balanced. The speed, with which a gas enters or is free in solution, varies as a function of the difference of the pressures (external and internal) and is conditioned by its molecular composition and the nature of the solvent liquid.

To compare among them the solubility of gases in liquids, you may consider their absorption coefficient, which is the volume of gas at normal conditions (T = 20 ° C and p = 1 atm) and expressed in milliliters which was dissolved in a milliliter of liquid. In the table are reported the absorption coefficients in water of some gases at different temperatures at atmospheric pressure:

| Gas | Temperature | | |
|---|---|---|---|
| | 0°C | 20 °C | 30 °C |
| helium | 0.0094 | 0.009 | 0.0081 |
| Nitrogen | 0.0235 | 0.015 | 0.0134 |
| Oxygen | 0.0489 | 0.028 | 0.0261 |
| Carbon dioxide | 1.713 | 0.88 | 0.655 |



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In order to understand the meaning of the data in the table, for example, consider the value of 0.028 corresponding to the coefficient of absorption of oxygen in water at 20 °C, at atmospheric pressure. This means that in a vessel containing water at 20 ° C, the gas phase above the liquid contains oxygen to the partial pressure of 1 atm, in a milliliter of water is dissolved O2 equal to a volume of 0.028 mL. In a pressurized tank with four bars, at the same temperature, this value must be multiplied approximately for four.

In essence, for each gas present in the air is possible to calculate what percentage is solubilized in water at the working pressure, but for practical purposes, the energy that will spend to compress the air will be a small expense, since the air compressed, not ever coming out from the volume of the tank (1) has only small pressure fluctuations, and once it reached the saturation point not dissolves more air. One that is consumed is due to the lower water solubilisation of the gas, at atmospheric pressure. In fact, when the water passes through the tank (3), provided with air vents, releases a small portion of air, which becomes insoluble to the atmospheric pressure, which comes through the vent (3.2). But, obviously, the transit times in this tank are very narrow and the complete air expulsion process can not occur, because, immediately go back into the water tank (1) where the gas can not escape from the surface of 'water, returning again to the maximum solubilization conditions.

However, irrespective looking energy, if we compare this system to the current hydraulic systems used in the apartments, we have to say:

- The oxygen which dissolves in the water improves the characteristics of purity and from the chemical and biological point of view do not form deposits and sludge in the tanks, being always the water in circulation.
- Allow for greater water saving, as with autonomous gas boilers and electrical heaters with normal bathrooms the hot water reaches the point of use (8) only after emptying the whole of cold water in the pipes, not existing in such installation the return pipe to the heater (9). While compared to the current distribution of condominium centralized hot water, which has the return pipe to the heated storage tank, the solution inside the apartment, has certainly less heat loss, having to travel a very short paths, obviously in tanks and coated pipes.

The current state of the art, this plant from the point of view of thermal hydraulics, can be compared only partially with implants made with solar thermal. But these can not produce the hot water needed in a building of many floors with many apartments, not existing surfaces required for the installation of solar panels.

Also from the point of view of energy production, you can compare very limited with photovoltaic panels, which produce electricity, but with lower yields and higher investment costs. Just think that to produce 3 KW / h required to only one apartment, on average, it takes about 30 m2 of surface, and it can produce only a few hours of the day.

In addition, solar energy can not do both things: either uses the energy absorbed from the sun to generate electricity or produce hot water, thus, a building with many apartments will never have enough surface to heat and conditioned all with a positive energy balance and cost.

From an economic standpoint, it was found that no renewable energy approaches the fossil energy yield burning a fuel directly, although this is lower (average 0.35 compared to the lower calorific value).

Although solar power is approaching the fossil energy costs, the necessary space, the discontinuity of energy production, does not allow it to deal with the pressurized water power that does not exist only because the current power producers, public and private, they do not pretend to understand it, but this energy is not based on secret formulas but logical reasoning and physical and scientific laws established for centuries. From energy calculations made by myself, which may vary only in according to the real yield of the machines, which have been hypothesized, having no possibility of making real prototypes, in small household systems the performance of such energy is ten times less than the fossil energy and in large installations with high flow rates of water, will also arrive at costs hundreds of times lower, since they decrease much the load losses in the water circulation.

In fact, today, hydropower is the only energy that far exceeds the efficiency of 100% compared to the energy expended, being produced with the water falling from the mountains, but this is a special case which cannot be repeated when the water that is in the top compared to the turbine is exhausted.

At least that was thought until did not occur the hydropower invention submerged, by the undersigned, who has shown that the famous "perpetual motion" is merely a special case in the atmospheric environment. In the aquatic environment, pressurized with the atmosphere or artificially in tanks, the perpetual motion also does not exist, but it is possible to multiply the energy spent getting an energy gain, until the motion, initiated by a pump continues over time. This multiplication of energy is accomplished by placing a pump submerged in the seabed upstream of a submerged turbine, and with the water from above intubation that feeds both. This solution does not allow the upper reservoir emptying and at the same time, feeds the turbine only by utilizing the kinetic energy that is produced in the descent tube due to the rotation of the pump. In fact, also in this case the energy produced by the turbine is much higher than that consumed by the pump, because it is increased by the force of gravity



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and by the atmospheric pressure acting on the entire basin, but where the pump creates a vacuum in the seabed, produces a downhill water continuously flow like a gate that feeds the turbine was opened. Although this flow depends exclusively on the rotation of the pump, it does not mean that the turbine produces only the energy supplied by the pump. In fact, if there was not the turbine which slows the speed of the water, the water velocity in the descent tube and at the outlet would increase by gravitational acceleration effect ($\sqrt{2gh}$), without a fixed pump speed will be able to control it , rasformando in heat all the kinetic energy, due to friction with the walls of the descent tube and at the outlet ($V2 / g$).

It 'obvious that this energy exceeds the efficiency of 100% compared to the energy expended, without violating the principles of the conservation of energy. In essence those rules do not contemplate special cases that exploit the energy of surface water position that is automatically renewed because incompressibility of water, that in a basin always full occupies the same space even if you perform internal currents, one-way and only from the top down, as previously described. In fact, the kinetic and electrical energy production can not oppose the static pressure of the basin, present at the output of the turbine, and because this pressure is also present on the suction side of the pump, and then the static pressures are balanced, both because the exit the turbine there is an outlet in an open environment where the only opposition that can find water that comes out is that of static friction with the water molecules that is at the exit of the turbine calculated by the known formula $V2 / 2g$.

Consequently, to the pump is required little energy to move the ducted water from top to bottom and then put into turbine connected in series, that by limiting the output speed, turns all the kinetic energy into electricity. The energy produced is always higher than the energy expended to run the pump. Everything depends on the positive hydrostatic h intubated above the pump.

The concept above of submerged hydroelectric energy can also be transferred to non-submerged hydroelectric energy, if instead of intubating the water by the bottom gate of a reservoir, we intubate the surface water which is discharged from the overflow and we put in downstream of the descent tube a pump in series to a turbine which discharges the water into another tube, but with much larger section than the descent tube, connected to the bottom of the upper reservoir. Also in this case we produce hydroelectric energy using only the dynamic pressure, the static being in equilibrium, as described above, with all the effects induced by the acceleration gravity. Also in this case the water that comes out from the turbine, requires only an energy $V2 / 2g$ and having the same density as that which is located in the upper basin, does not need to be raised, since such circumstances, the upper reservoir is full and feeds the pump which in turn feeds the turbine, which discharges the water into the wide pipe section connected to the upper reservoir.

In fact, those who assert that the underground hydropower is against the principles of conservation of energy, does not know these principles, since this energy transforms into electricity that energy that is produced by the hydrostatic height h and acceleration of gravity g, which would be dispersed into heat because the energy is transformed, not destroyed. But it is clear that the energy submerged and always filled basins was never produced because to produce it were necessary four conditions which have to co-exist simultaneously and that no one has never thought to put together: atmospheric pressure on the surface, intubation from surface water, in series combination of a pump and a turbine, position of pump and turbine under hydrostatic height h. If miss one of these four elements, or stops the pump that breaks the hydrostatic equilibrium does not produce any energy. The reason is very simple: because, not being able to take advantage of the hydrostatic pressure of the reservoir, we use only a tiny fraction of water position energy specifically ducted and separated from the surrounding waters, creating a vacuum in the lower part, so that the water inside the hose could drop into the seabed due to the gravitational force and the atmospheric pressure, producing a kinetic energy much higher than that consumed by the pump that simply moves the water of a few centimeters down, triggering a kind of siphon that stops when the pump is stopped. This condition does not exist in nature and was not easy to intuition, therefore, it is evident that this energy would never come off without these arguments. But this reasoning, which for unknown reasons, no one has financed, have led to more reasoning even more efficient from an energy standpoint. Therefore, the progress of the state in the hydroelectric sector with the water recycling is due only to advance virtually. Probably, the professors who teach hydrology in universities around the world do not have the humility to admit that he had not made such reasoning, whose absence has affected the environment and world economic development. This is also necessary to say talking about the art of hydro generation was because the silence of the world's scientific authorities continue despite all the publications and patents filed later by myself. In fact, from the initial reasoning simply using a normal pump which pumps water into a turbine, it created another reasoning that allows to produce energy even while raising water from a lower reservoir to an upper reservoir, which has led to a new invention called "electric pump with double separate power supply until the impeller". ". Which it runs fed from two separate hydraulic circuits. In fact, we can produce energy in the turbine with the water that beat from the upper reservoir, which also in this case must be



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kept always full, and collect the water that comes out from the turbine in tank placed in the low position, which feeds only one side of the pump with the dual separate power supply until to the impeller, while the other side continuously recycles the water of the upper reservoir. The essential condition for the functioning of the pump and related plants is that the two flows are hermetically separated until the entry into the impeller. In fact, being the feeds fixed and the flows very similar, they introduce in the same sector of the impeller in rotation, alternatively, the water that comes from the lower basin and that which is recycled from the upper reservoir. Consequently the water of the lower basin is inserted into the the recycling circuit of the upper reservoir, being unique the pump delivery. But since the volume of the upper reservoir is limited, the excess water exits from the overflow and feeds back the turbine in an infinite loop, until the pump runs, as in previous cases. With this new system, if we take from the overflow of the upper water basin for other uses we not excessively reduce the production of energy, being able to integrate with drawn from the lower basin water. Today the water lifting systems are very large energy absorbers and can not recycle the water producing energy in the turbines because the lifting without the pump with the double separate supply until to the impeller and the relative water recycling circuit which uses the pressure hydrostatic of the upper basin, it costs plus of energy produced by the turbine. Contrary hydropower submerged and with the total water recycling, the implants made with the pump having dual separate supply, produce energy only with the amount of water that is renewed entering by the feed opposite to recycling, but the advantage is considerable, since there are no limits to the height in which the water can be raised only spending the energy for the recycling of about twice the water flow that produces energy in the turbine. To realize the energy difference between a water recycling and a lift is enough to think that recycle 1000 L / s of water in a pipe Dn 800 one kilometer long, it requires the pump head of 1.5 m. It means that the water to move horizontally or recycle it in a closed circuit, without lifting it should be an energy about 666 times (1000 / 1.5) lower than lifting against the gravitational force. This ratio increases with larger pipes and decreases with small pipes, but also in domestic systems, that in this respect, are the most penalized, the ratio stood at values of a few dozen. But considering that we do not need fuel to produce this energy, being the main energy source of compressed air cushion, which acts as the atmospheric pressure in the artesian wells, but in a more powerful way because in domestic systems use a pressure about four times higher at patents filed later by myself. In fact, from the initial reasoning simply using a normal pump which pumps water into a turbine, it created another reasoning that allows to produce energy even while raising water from a lower reservoir to an upper reservoir, which has led to a new invention called "electric pump with double separate power supply until the impeller". ". Which it runs fed from two separate hydraulic circuits. In fact, we can produce energy in the turbine with the water that beat from the upper reservoir, which also in this case must be kept always full, and collect the water that comes out from the turbine in tank placed in the low position, which feeds only one side of the pump with the dual separate power supply until to the impeller, while the other side continuously recycles the water of the upper reservoir. The essential condition for the functioning of the pump and related plants is that the two flows are hermetically separated until the entry into the impeller. In fact, being the feeds fixed and the flows very similar, they introduce in the same sector of the impeller in rotation, alternatively, the water that comes from the lower basin and that which is recycled from the upper reservoir. Consequently the water of the lower basin is inserted into the the recycling circuit of the upper reservoir, being unique the pump delivery. But since the volume of the upper reservoir is limited, the excess water exits from the overflow and feeds back the turbine in an infinite loop, until the pump runs, as in previous cases. With this new system, if we take from the overflow of the upper water basin for other uses we not excessively reduce the production of energy, being able to integrate with drawn from the lower basin water. Today the water lifting systems are very large energy absorbers and can not recycle the water producing energy in the turbines because the lifting without the pump with the double separate supply until to the impeller and the relative water recycling circuit which uses the pressure hydrostatic of the upper basin, it costs plus of energy produced by the turbine. Contrary hydropower submerged and with the total water recycling, the implants made with the pump having dual separate supply, produce energy only with the amount of water that is renewed entering by the feed opposite to recycling, but the advantage is considerable, since there are no limits to the height in which the water can be raised only spending the energy for the recycling of about twice the water flow that produces energy in the turbine. To realize the energy difference between a water recycling and a lift is enough to think that recycle 1000 L / s of water in a pipe Dn 800 one kilometer long, it requires the pump head of 1.5 m. It means that the water to move horizontally or recycle it in a closed circuit, without lifting it should be an energy about 666 times (1000 / 1.5) lower than lifting against the gravitational force. 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wells, but in a more powerful way because in domestic systems use a pressure about four times higher atatmospheric pressure. Another important application filed as patent by myself, for this type of energy, as well as for home, house systems, is that concerning the replacement of heat engines on means of transport, simply placing side by side a pressurized tank with compressed air and a tank at atmospheric pressure. In fact, the water passes from the tank to the atmospheric pressure to the pressurized by means of the pump with the double separate supply until to the impeller, which in the meantime, through the second power, by recycling the water in the pressurized tank and balancing in the impeller in rotation the pressure of input and output also allows the entry of renewal water that enters in the impeller and consequently in the recycling circuit and in the pressurized tank, bypassing the pressure of the air cushion. Obviously, adjusting the flow rate of water through by motors with inverters and the degree of opening of the valves with stepper motors and position transmitters with signals in milliamps is possible to finely adjust the energy produced by the plants that use the compressed hydropower. This adjustment is very useful especially on means of transport where current heat engines need a much more complex, having to control the combustion parameters, the speed control of the motor, the filtration of the smoke and the temperature of the engine at the same time. Nearly 150 years of history of internal combustion engines have not yet solved especially environmental problems, but manufacturers have no desire to abandon the thermal and thermal power engines, which also serve to charge the cars powered by lithium batteries which is a material expensive and being depleted, while thriving solar energy and wind that have encumbrances, environmental impacts hundred times faster compressed hydroelectric energy. The so-called new energy that the world's environmental authorities are carrying out are discontinuous in energy production, require special materials, they also running low, and the cost per kWh produced is at least ten times higher than the cost of energy with 'compressed hydropower.

Another application, also filed as a patent, may be used for the protection of the environment submerging pressurized tanks in the waters subject to flooding. In fact, we can use the pressure of the air cushion to produce energy, both to defend the territory against flooding, simply by diverting the water outlet of the pressurized tank to the turbine, or to a specifically prepared area to accommodate flood waters. In fact, we must not forget that the air cushion can be up to 35 bar before the water, at environment temperature, becomes liquid. All this without counting that these plants produce energy while dissolved oxygen in the water contributes greatly to self purification. Obviously, in all systems, large and small, fixed and mobile, it must always be the pump with the separate supply to introduce water into the pressurized tank, without allowing the expansion of the air cushion, as occurs in the tanks at atmospheric pressure that discharging the water from the overflow. In fact, only the water that comes from the pressurized reservoir, similar to the overflow of an open reservoir, can be used to produce energy, or be raised for the defense of the territory, with an energy gain, while respecting the principles of conservation of energy

It is no coincidence that the "domestic pressurized hydraulic system, hydropower producer" was born in the end after studying ways to reduce the overall dimensions of the pressurized hydroelectric plants, both to let them in car trunks, both to let them in the cylinder of wells. In fact, the solution of the double-flanked tank, is nothing more than the solution used to realize hydroelectric engines compressed on means of transport but in this case the energy outputs from produce are lower and the adaptations are needed, such as the double system for water cold and hot, to distribute the water to the various users of consumption, distribution and thermal conditioning of the housing. While the studied system for lifting, oxygenate and produce energy in the wells, can be used without particular modifications to feed the water necessary to the individual apartments, or by integrating the energy production, both for exchanging the low enthalpy geothermal heat with the subsoil. This solution does not require fuel or solar energy, with the coupling between the internal system of the apartments and the inner to the geothermal wells, may even make acceptable living conditions to the north and south poles, where the polar night lasts six months. But for the moment it would be sufficient to eliminate the millions of outdoor units of air conditioners that with the exchangers air / currently contribute to global warming air, and reduce the proportion of CO2 from the environment simply by oxidizing domestic waste water and rainwater by means of artificial rain water in limestone greenhouses, was placed on urban purifying or nearby, as already proposed by me in previous patent deposits, as shown in Fig. 6 of the drawing 2/2. In fact, with the compressed hydroelectric as shown, we can produce energy even lifting the water, because the pressure of the air cushion easily overcomes differences in height of a few meters, while the pumps with double separate power supply we can retrieve all the waters' infinity, until it becomes alkaline, with energy costs amply compensated by pressurized hydroelectric production. So the demolition of CO2, SOx and dust present in the environment, which is deposited, especially in the urban atmosphere low-lying areas, it would not cost anything from an energy point of view. And 'only necessary modifications of existing purification plants, bringing them back where they produce pollution, because those who brought the cleaners out of the city walls has only created chemical biological and economic disasters. If the environmental authorities will dispense with opportunities to continue



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using purification systems such as activated sludge, places outside the cities, after kilometer sewer degenerative pathways, it is not only environmental incompetence, but stubbornness to want at all costs, damage the environment, 'economy and the health of citizens.

From all the above considerations it is clear that hydropower pressurized with compressed air, is certainly the cleanest energy, efficient, economical, easy to manufacture, with a small footprint and the minimum investment. It summarizes the physical and hydraulic principles on which they are based:

In these systems, we exploit two different hydraulic systems: one in favor of energy production that exploits a physical force (compressed air) is not produced by the hydraulic system and one favorable to energy saving during water recovery, which bypasses this physical strength, exploiting the incompressibility of water, in the following way:

- At the entrance of the turbine exploits the dynamic water pressure caused by the air cushion, which would expand, but can not expand, because the pump simultaneously with the dual separate power supply until the impeller introduces, through the impeller in rotation, from the side extractor, the same amount of water that out of the tank;
- Entrance of the pressurized tank takes advantage of the fact that being in balance the pressures upstream and downstream of the impeller on a side of the pump, when this is in rotation, there being a clear separation of incoming flows arriving to the impeller, when this wheel entry permit in the same sector of the impeller, the first water that comes from the outside and then the one that comes from within and both streams are output in the direction of the pump inside the pressurized tank. Where the water finds no opposition, by the hydrostatic pressure existing in the tank, being an internal circulation to the accumulated volume, going simply and simultaneously to fill the void left by the water that comes out to feed turbine. It 'important to dwell on the fact that the water that comes out is replaced instantly by water which enters, for which the hydraulic system does not alert the entry of outside water to the inner one. Another important thing to keep in mind is the fact that the air cushion for any reason it has to expand, because being domestic installations and to wells with small volumes immediately make empty the air cushion, thus the valve that cuts down the turbine must be always closed and open only when the pump is in operation with the dual separate power supply (4), without which it would not be possible to circumvent the internal pressure of the container (1). But it is also important the way in which it feeds the pump, so that in the inlet section represented by the cross-section AA of Fig. 1, we have two or four separate streams in the high pressure (ha) and low pressure (lp), arranged diagonally if there are four, in order to balance the hydraulic pressures in the impeller and on the bearings. In order that this separation of the flows can take place is necessary to start from the flow diverting log (5) in that the double curve with separator baffles (4.5), must already receive the stream channeled into the correct position, so that (if they are four) can cross them as represented in section. A-A. Then, the half of the particular curves (4.5) using only half of the passage section, already arranged diagonally, that flow in only one input section of the pump already divided into four sectors until to the fins of the impeller. In fact, with this type of supply, when the impeller is rotating, receives in the same quarter section, water flows with the alternating sequence hp - lp, using the water thrust with higher pressure (hp) to push forward, the water with less pressure (lp). On the other hand this hydraulic principle is already used in multistage pumps, where the water retains its total dynamic pressure (flow rate * unit pressure * the passage section), and increases from stage to stage, entering the center of the impeller , exiting at the periphery of the same, and returning to the center of the next stage, to effect, in particular, of the strength of the total dynamic pressure that follows the path of the impeller blades (4.4) and the diffuser of the pump body (4.6), as evidenced, in enlarged detail of the pump (4) of fIG. 2. With the increase of the working pressures is also important to the accuracy of machining, which prevent leakage in the reverse direction to the flow. In fact, the multi-stage pumps also reach operating pressures in unique sense of hundred bars.

It 'difficult for the experts, especially for pump manufacturers, to admit that the pumps should have been designed to get the forces that oppose the lifting of the waters, as indeed is the case in the mechanical lifting. In fact no one raises mechanical lifting weights directly, but does so through many systems that reduce the effort (inclined planes, rolling friction, relationships belt drive, gear, etc.). Who knows how they work and how the pumps are built can not have doubts about whether the pumps with double separate power supply are functioning. It can vary only the performance of a type of impeller and the other, but this regards large plants with high flow rates and small heads. In domestic systems the choice of impeller is almost obligatory. It is single stage pumps with closed impeller. Therefore, it is worthwhile to turn the condominiums and individual apartments from absorbers to power producers, providing energy to the public sector and industry and completely eliminating fossil fuels.

For the construction characteristics of a pump with a double feed on the suction side, it is necessary that both feeding inlets are equipped with a positive



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hydrostatic head. Therefore in the case of small plants, with little geodesic inlet height, as in Fig. 1 has been provided an additional pump with single supply (3.4), which slightly increases the dynamic pressure on the pump suction dual feed (4) from the side fed with water discharged from the turbine. Obviously, the pressure increase is also synchronized by means of the inverters connected to the control engines (4.1).

As can be seen from the schema Fig. 1, not all the water that goes in distribution collectors (6 and 7) passes through the turbine (2), producing energy. But that which passes through the turbine needs to discharge the water to atmospheric pressure. In fact, the momentary output of water from the pressurized circuit to the atmospheric pressure is needed to produce kinetic energy in the turbine atthe expense of the energy conferred by the compressed air pressure. But since the same amount of water, by means of pumps (3.4) and (4), the control valves (2.2 and 3.3), the level of replenishing (3.1) and the automatism of the control system, immediately falls in the tanks (1) without expanding the air cushion and lower the pressure, this plant continues energy production during the water outlet from the taps (8) and the supply of heating or cooling. In fact, in the system of hot water and the cold distribution, the simultaneous maintenance of constant levels of the two tanks (1 and 3), it does not involve energy costs to win the hydrostatic pressure, or to compress the air cushion, but only load losses for the circulation of water, under the accumulated volume of the two tanks. Obviously, if you exceed the capacities for which the plant was designed and levels (1.1) are not maintained, the pumps (3.4 and 4) must increase the number of revolutions to increase the scope and compress the air cushion that it is expanded.

Suppose we create a small domestic system produces energy by means of the two AC generators (2.1) coupled to two pumps used as turbines (pat), exploiting the useful height Hu = 40 m and a dual feed pump DN 65 with flow rate 7.5 L / s. Already by the size of the pump, the turbine and of the tubes, we realize that these systems are very different from the current domestic installations, which rarely exceed the DN 20 for the tubes and the water circulation pumps. But these dimensions are not to impress because water consumption is always the same, since water that produces energy in total recycling. Assuming the turbine efficiency is 0.6, applying the formula $Pu = \eta * 1000 * Q * Hu / 102$, we have an energy output of 1.76 kW (0.6 * 1000 * 0.0075 * 40/102). Assigning to the pump a prevalence of 0.5 m and a yield 0,6, the power absorbed by the same, which leads a double flow of that which passes into the turbine, calculated by the formula 0.5 * 1000 * 0.015 / 102 * 0, 6 = 0.122 KW. While the additional circulation pump (3.4), with a flow rate equal to half, suppository with the same yield and prevalence absorbs half of the energy calculated for the double feed pump (0.061 kW). In this case the ratio between the energy expenditure and yield is 9,61 (1,76 / 0, 183). The net energy produced between the two systems side by side is (1.76 to 0.183) * 2 = 3,154 kW, which may further increase by increasing the pressure of the air cushions or the revolutions of the motors driving the pumps.

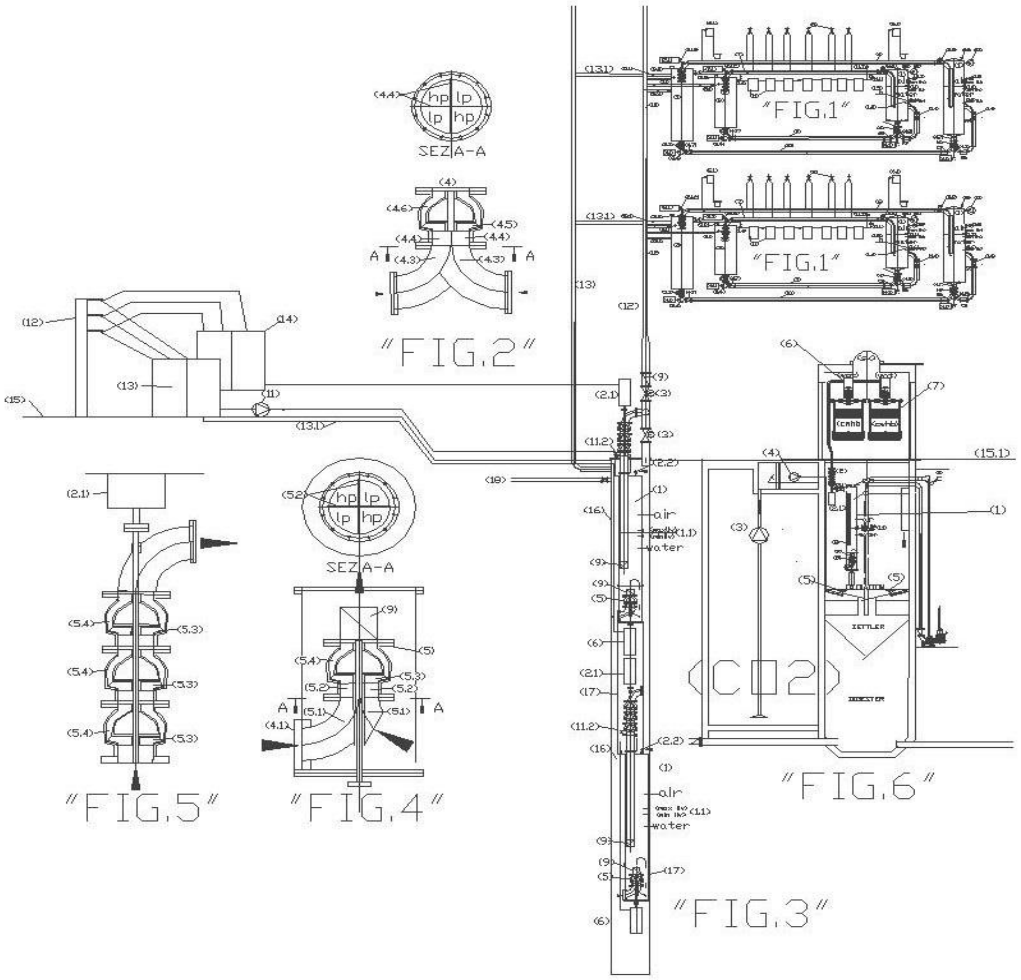
If the relationship between energy expenditure and yield divide it by the average efficiency of thermal energy to have the relationship of convenience between the compressed hydropower and thermal energy that equals 27,45 (9,61 / 0, 35). If we add to this value the investment costs to achieve the thermal power plants, the costs for the transport of energy, the costs for the extraction of fuels subsoil, refining, transport, marketing, the depuration and also add you the missed benefits that brings the oxygen that dissolves in the water we use to produce energy, it is no exaggeration to say that the fossil energy is one hundred times less convenient of compressed hydropower that no one has ever thought of producing. This difference becomes even more evident in pressurized large hydroelectric plants, especially for the defense of the territory from high waters and floods. If these inventions were born before probably it would not be worth it to extract from underground fossil energy, since there is not much difference between a mobile hydroelectric power generator mounted on means of transport and those described in the plants in question. There would be even running to expensive renewable, discontinuous and not interactive with the environment. But these inventions arrived later and everyone pretends not to understand them in order not to collapse on the stock exchange of an industrial society and economic completely wrong.

As written above the average consumption of a household is less than 0.30 KWh, so these plants will provide energy even to urban public facilities. Already today those who produce photovoltaic electricity, supply energy to public energy managers, but the considerations of renewable current costs and environmental usefulness have already been made above. Without government incentives photovoltaic energy would not exist, as there would be no solar thermal. Instead, does not exist "the pressurized domestic hydraulic system, producer of hydroelectric energy" that does not need public incentives, but only to public rules and regulations obliging manufacturers of pumps and systems to adopt solutions that preserve resources and materials. In order to understand the industrial development of this application and of the systems connected to the same technology, it was also processed the drawing 2/2 in which in addition to Figures 1 and 2 shown on drawing 1/2, already described, are also reported other figures directly linked to the urban environment and to the compressed hydropower production, already deposited with previous patent applications.



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Fig. 3 illustrates how it is conceived the geothermal well (16) that feeds the condominium water network (12) and receives the drain water from the overflow of open tanks (3) of Fig. 1, renewing it with water with temperature more low from the geothermal well.




"2/2"

*Legenda disegno 2 / 2:*

Legend: (1) Steel pressurized tank; (1.1) level regulator with capacitive probes; (1.2) Safety valve with exhaust air in the water; (1.3) pressure gauge with shut-off valve; (1. 4) terminal element flanged of the pressurized tank containing the pump with the double separate power supply; (1.5) flange connection for suction out of the well(2) pump used as a turbine; (2.1) submersible alternating current generator; (3) motorized valve with flow regulation; (3.1) on-off valve with pneumatic control(4) water return socket in the well; (4.1) suction filter; (5) electric pump with double separate supply until the impeller; (5.1) Double curve with septa crossed separators in low pressure (lp) and high pressure (hp); (5.2) baffles of flow separators; (5.3) pump impeller; (5.4) diffuser of the pump; (6) drive motor of the pump with variable speed, controlled by an inverter; (7) motor or alternator coupling; (8) transmission shaft; (8.1) pipe for the passage of the shaft; (9) check valve. (10) pipe of pressurized water output; (11) electro compressor with the storage tank (11.1) network for supplying compressed air; (11.2) solenoid valve and check valve of compressed air; (11.3) pressure switch with regulator; (12) network for the electricity distribution ; (13) electric panel and control system; (13.1) electrical system power cables; (14) up transformer for the supply of energy produced to the public network; (14.1) electric cables for transport of energy produced; (15) altitude of the land; (15.1)



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Maximum water level; (15.2) altitude of the seabed, lake or reservoir. (16) steel shirt of the well; (16) perforated shirt of the well to the water inlet; (17) steel profiled spacers between the pressurized tanks; (18) supply from a public water distribution network with solenoid valve slaved to the minimum level probe of the geothermal well.

As can be seen from Fig. 3, the pressurized tank (1) is fed from the bottom with the water of the well in which it is immersed and from the top by the compressed air. The water enters through the filter (4.1), which feeds a side of the pump with double separate supply, but at the same time in the tank is also recycles the pressurized water from the compressed air that enters from the second supply of the incorporated pump in the terminal element (1.4). The internal recycling the pressurized tank serves to balance the static pressure in the impeller of the pump and allow the entrance of the water from the outside of the pressurized tank in the pump through the second inlet, bypassing the opposition of the tank pressure.

In fact, the static pressure is not opposed kinetic Energy that develops within the accumulated volume, therefore, recycling the water on one side of the pump which is fed also from the other side with a flow of water produced by only hydrostatic height not pressurized. Although the flow rates on the two sides of the pump are not perfectly equal, increasing the number of revolutions of the pump with the dual supply increases the flow rate introduced, since the recycling only serves to introduce the external water to be ejected from the air cushion without expand, oscillating between the minimum and the maximum level of the tank (1.1), which can be governed only by the volume of water introduced in the tank pressurized by the second suction mouth of the pump and by pressure of the air cushion. Therefore, to maintain constant the water level in the pressurized tank and produce energy with the maximum of the pressure of compressed air, it is necessary to realize well-balanced sound systems between the flows in the entry, exit, and the compressed air pressure, which must be preserved to the greatest possible time by restoring only the amount of air that is dissolved in the water. Obviously the greater the pressure of the air cushion, the greater the amount of producible energy through the pump used as a turbine (2) with related alternator (2.1). To make sure that the flow rates are perfectly equal, the control circuit acts simultaneously on the motorized valves (3), and the variable speed motor coupled to the pump (4), when they are inserted in the circuit, but above all, with the engine rpm variables (6) of the pump (5) with the dual separate supply.

In figure 3 it is shown a multiple system, with several pressurized tanks and relative superimposed energy circuit. In the figure for reasons of space one can only see two. But this is less cumbersome system, more efficient and cleaner to produce energy locally. It is not necessary that the well is connected to the aquifer. It can also be a blind shaft that always recycles the same water, but if it is connected to the aquifer the production of energy does not damage oxidizes when in the waters consuming nitrates and organic compounds, making the water more drinkable. Obviously, only the arranged above system can be used for the lifting of water, all those below serve only (so to speak) to the energy production and oxidation of water. Obviously, if you install the systems in groundwater wells to lift the water the dynamic level of the well (15.1) should reach the upper plant.

In the systems proposed, the water is enriched with oxygen with high pressure in the tank (1) while energy is being generated, or is raised to the surface for the distribution of water, also while energy is being generated. In fact, the two control valves (3) at the output of the turbine may divert the flow where it is required and manage the residual pressure according to the needs. In other words, not only the production of energy will be without appreciable costs but will also allow us to oxidize the water directly improving the purity of water.

So, suppose to realize in a well a submerged implant of Fig. 3, which produces energy by means of six overlapping circuits, each equipped with a submersible AC generator (2.1) coupled to a pump used as a turbine (pat), that exploits the effective height Hu = 35 m and a dual fuel pump DN 150 with flow rate 35 L / s, modified as shown in Fig. 2. Assuming the turbine efficiency is 0.75, applying the formula Pu = $\eta$ * 1000 * Q * Hu / 102, we have an energy output of 9.0 kW (0.75 * 1000 * 0,035 * 35/102) for each circuit. Assigning to the pump a prevalence of 0.4 me a yield 0,6, the power absorbed by the same, which leads a double flow of that which passes into the turbine, calculated by the formula 0.4 * 1000 * 0.070 / 102 * 0, 6 = 0, 0456 KW. The plant consists of six water inlet circuits and six output circuits produces a total of 53.7264 kW (54 to 0.0456 * 6) excluding the energy absorbed by the compressor to maintain the pressure constant of 35 m column of water, which is even more negligible the energy consumed for recycling, the pressure having to provide only the amount of air that solubilizes in water.

In this case the relationship between energy expenditure and yield is 196.36 (53.7264 / 0.0456 * 6). Much higher than that calculated for the domestic installation of FIG.1, in part because we hypothesized higher yields for the pumps and larger turbines, but above all, for the higher flow rates and the absence of load losses, since the 'water is recycled within the same pit be raised).

We should not be surprised by this result whereas in hydroelectric with hydraulic jump does not consume even the few watts required to internal water



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recycling circuit. The energy reasoning is also valid for much higher size installations, obviously with different yields of the electric pumps, in function of the mounted type of impeller, the flow rate, the nominal point of operation, etc. But in any case the ratio between the energy produced and energy expenditure will depend on the water by the pressure of the air cushion and will always have a higher value of several tens of times, or some hundreds. In fact, the 35 meters of water column used in the formula can be ten times higher in some applications. that have not yet been developed.

It 'obvious that with energy costs so low it can be assumed also to make livable the polar regions mainly producing wells geothermal energy producers connected to the pressurized hydraulic systems, hydro power producer of surface that would create the environmental conditions of life and survival food business .

The FIG. 2, 4, show the enlarged details of the pumps with the dual separate supply until to the impeller in a different version for intubated installations and those submerged in wells, that for reasons of space, they are made differently.

The FIG. 5 shows the enlarged detail of a multistage pump used as a turbine.

La FIG. 6, mostra che la depurazione locale dell'acqua e dell'aria diventa ancora più efficiente e sostenibile, sostituendo le pompe dei principali sollevamenti idraulici con gli impianti pressurizzati i nelle versioni poco ingombranti utilizzate nei pozzi geotermici condominiali, o normali, per ridurre i consumi, migliorare l'ossigenazione dell'acqua e rendere i sistemi depurativi produttori di energia anche nei processi depurativi. In fact, in these systems the lifting pumps were replaced with complete plants described in Figure (3), which use the air drawn from it where it accumulates the CO2 to produce compressed air, by means of the fans (3) and of compressors (4), is to compress the air cushion in the pressurized tank (1), is to enter it in the diffusers (5) which oxygenate the water directly. In these plants, with the residual pressure at the outlet of the turbine (2) lifting the polluted water tothe water overflow trays (6), which produce an artificial rain on steel baskets covered with filter cloth (7) containing calcareous material and residues of concretes. The water that undergoes this process, in addition to purify, becomes alkaline, subtracting CO2 environment, while the sewage treatment plant built with this system produces more energy than it consumes.

The system, object of the present invention is the last of the series concerning the production of energy with the recycling of the water in an open vessel and compressed version. Unfortunately, to the inventor does not touch only make a point about situation state of the art at the moment of birth the invention, but also the point of the whole society creates obstacles to the emergence of a sustainable environment and protective solution. Participate, especially public entities, which should adopt these solutions in the interest of all. It almost seems to be back in the time of Galileo Galilei, when science denied that the earth revolved around the sun, but in those days they could be in good faith. Today, however, there are specific responsibilities, especially by the environment and the world economic development ministries that have already made void to the undersigned four international patents and many national concerning the global water treatment systems involving water and air together, even producing energy biological, that would lead to the cleaning of fossil energy produced by thermal power plants and from the smokestacks. Unfortunately, those solutions have shown that the existing thermal power plants and water treatment plants were wrong from the ground, failing to take account of the full carbon cycle and the chemical and biological processes involved both in combustion processes, both in the long and jagged paths sewer. The worst environmental choices that could be made were precisely the ones that have been made: large thermal power plants and large purifiers, the former can not close the carbon cycle for the immense amount of water that would be needed, and the latter are cathedrals in the desert that far from urban pollution are not useful, especially in air purification. Even the global purification systems, proposed by myself, should have been considered heritage of humanity because they proposed small thermal power plants combined by fossil and biological energy production, with heat recovery and water alkalization, consuming CO2 in greenhouses with limestone artificial rainfall, while the sewers which are currently degenerative water and sludge would become purifying of water and air together, of which a small example is shown in Figure 6 of the drawing 2/2. Unfortunately these solutions, costing many years of work, instead of being adopted and universalized were met by a global silence, in spite of the international agreements signed by all countries at United Nations.

According to the international treaty of 2001 drafted by the United Nations, called "Coding Project on responsibility of States for internationally wrongful acts", governments and the United Nations itself have the power and the duty to adopt as their own environmental and energy projects that have global utility. Why do not they do it? Why do they pretend not to know them when they are deposited right at the ministries of economic development of individual countries? Why leave invalidate patents that would protect the environment and which would make it read the balance of payments instead of promoting solutions that enrich only those companies that waste resources, pollute and warm the planet?

The main reason for which the protection of the environment is of public relevance throughout the world, is mainly due to the fact that the protection of the



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environment and energy plants must be designed globally and coordinated with each other to positively interact with the environment surrounding, closing all organic and inorganic cycles that open. These functions can not perform them private companies because they have to be above the interests of a party, choosing the best technologies available to the state in all areas. In fact, private companies generally specialize in individual industrial sectors, producing machines that can be used in purifying and energy systems, or are specialized in public tenders, which are limited to the design of detail already set by public planners across disciplinary Contract. Unfortunately, even the public planners have no preparation to set global projects because the global projects should be based on synergies between different sciences and technologies but put together taking into account the organization of industrial work, which involves crosscutting technical choices to the different sectors and propose new machinery and systems not existing on the international market. The global engineering currently not learns in the best universities of the world because individual faculties do not work collegially, they also being focused on specialized research. The undersigned who had cross experiences, for nearly forty years as a technical installer of environmental and energy industrial systems has realized that all energy and water treatment plants are not complete and current with low yields precisely because are specialists in individual sectors. The technologies can be saved but must be put together in global systems, that are both energy and water treatment. Just will start this process of rationalization you will immediately encounter the first results not only in stopping CO2 emissions, but even in the inversion process, subtracting CO2 from environment. Over all, realizing synergistic systems, biological and especially by compressed hydroelectric it would save a huge amount of resources and materials already running low, as demonstrated throughout http://www.spawhe.eu website. But if governments give up their right and duty to guide investment and to legislate what private companies must do, the protection of the environment and sustainable energy never happen.

Governments fail to reduce the CO2 from the Kyoto Protocol today has increased from 360 to 400 ppm in the atmosphere because it is important, above all, the ways in which you get the reduction of CO2, which must be interactive systems that bring materials and minerals in its place.

The new energy and cars powered by battery are not going in the right direction and do not have even technical and economic justification to appeal. These solutions seem to be become competitive only because they are approaching the cost of fossil energy. But who says that fossil energy is the cheapest? The undersigned has no doubts. The myth of the low cost of fossil energy must be dispelled and, consequently, that of the new energy, that over all, are not those which serve to reverse the process of global warming of the planet.

Writing these things in a patent application should be limited to the technical description of the state, it is my opinion that state of the art should be described without hypocrisy in the interest of science and technology. But it must also be described the reasons for which state of the art does not advance. In fact, the current state of the environment and the world energy involves all the world's environment authorities, who are unable to develop global projects and not even want to talk about it with those who propose them. Even the Patent Offices, which should be impartial and documented scientifically and technologically, have called "perpetual motion" the first patent applications of submerged and pressurized energy, which for myself, instead, are the most economical and clean energy in the world and they should be considered a World heritage Site. It is precisely the difficulty of understanding of these patents that They have spurred myself to propose different solutions, especially pressurized, so that it is fully clarified in the interest of all humanity.

The environmental and economic development of the world's authorities also towards hydroelectric energy with water recycling are using the same strategy of the silence, used against of global purification systems. Although in words they say and write that they want to fight global warming, in fact, the inventors who deal with these problems must face alone the law of the powerful multinational market, which, clearly do not want to clean the fossil energy in a sustainable way to protect the investments made in the opposite direction. To the old fossil and nuclear energy corporations have added new multinational of water and cleansing management, who live by contracts, no research and innovative designs, and others that produce renewable energy that have the only advantage of not emit CO2, but they are expensive, cumbersome, uneconomical, discontinuous. The undersigned does not doubt that the half depuration and half energies are not a step forward compared to the past, but the steps are very small when you consider the billions of resources spent to achieve these results. While the projects and patents of the undersigned that does not cost a cent, or euro to no World taxpayer, are based mainly on the globalization of environmental protection, producing energies that interact with the purification, chemical, biological and geothermal energy with low enthalpy. But what worries is most of all, the systematic silting of sustainable and comprehensive logic solutions, which implement precisely those who have the institutional role of protecting the environment and human health. Patented solutions, that the undersigned has collected http://www.spawhe.eu website, would not even need to be tested but only implemented, having already been

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tried nature. In fact, they represent the industrialization of nature implemented by cycles to close the carbon cycle, dissolve oxygen in the water, creating artificial currents of water for energy and nutritional purposes. Nothing to do with the current energy and water treatment systems using separate principles, physical, chemical and biological studied in laboratories with low yields, which applied in the environment do not produce any synergy between water and air, physics, chemistry and biology, contrary to the potential demonstrated by the undersigned that multiplies the returns by just copying from nature.

Are shown below some articles of ""codification project on the responsibility of states for internationally unlawful acts" that should above all protect the environment, as described above, developed by the United Nations.

*Article 1*

Responsibility of a State for its internationally unlawful acts.

Every internationally wrongful act of a State entails its international responsibility.

*Article 2*

Elements of an internationally wrongful act of a State

There is an internationally wrongful act of a State when conduct consisting of in an action or omission:

a) it can be attributed to the state the same way as international law;
b) constitutes a breach of an international obligation of the State.

*Article 15*

infringement resulting in a complex act

*Paragraph 1:* The breach of an international obligation by a State through a series of actions
or omissions, defined as a whole as illegal, is perfected when producing the action or
the omission which, together with other actions or omissions, is sufficient to constitute the wrongful act.

*Paragraph 2:* In such a case, the breach extends over the entire period starting with the first of the actions or omissions of the series and lasts for as long as these actions or omissions are repeated and remain not
comply with the international obligation.

*Article 48*

Invocation of responsibility by a State other than an injured State

*Paragraph 1:* Any State other than an injured State is entitled to invoke the responsibility of another State in accordance with paragraph 2 if:

a) The obligation breached subsists against a group of States including that State, and established for the protection of a collective interest of the group;
b) The obligation breached arises towards the international community as a whole.

*Paragraph 2:* Any State entitled to invoke responsibility under paragraph 1 may claim from the responsible State:

a) cessation of the internationally wrongful act, and assurances and guarantees of non repetition in accordance with Article 30;
b) compliance with the obligation of reparation in accordance with the previous articles, in the interest of the State offended or breached the obligation beneficiaries.

*Article 54*

Measures taken by States other than an injured State.

This chapter does not prejudice the right of any State, entitled under Article 48, paragraph 1 to invoke the responsibility of another State, to take lawful measures against that State to ensure cessation of the breach and reparation in the interest of the injured State or beneficiaries of the obligation breached.

*Article 58*

individual responsibility

These articles are without prejudice to any question as to the responsibilityindividual under international law of any person acting on behalf of a State.

From the reading of these articles, it is clear that there is responsibility of all sovereign states on the current environmental degradation and even the United Nations that produced the document and each year they organize a world leader to fight global warming. But individual responsibilities are also of individual persons acting on behalf of States. Escapes of responsibility of global public officials, at all levels, for myself, have created and create more damage of the eco-mafia, which can be identified and convicted of civil and criminal law, while the scientific and technological half-truth, half-depuration, the half energies should be locate and correct themselves. Not only they do not intervene, but also ignore the global energy systems and water treatment and hydroelectric energy with recycling water, with or without depuration, as they ignore the hydro motors that could be used on transportation. There are no democratic institutions able to name and shame those, who in the opinion of the undersigned, are authentic masked crime awkwardly, just because a minimum of competence, to understand that all current purification and energy cycles are incomplete especially because the energy systems do not interact with the environment. The undersigned as a designer and inventor could only put on paper how, in his point of view, should globally be designed facilities that would be never merely purifying and never merely energy. Hoping only that they should not be posterity to determine whether has right or wrong.

For the undersigned, even social problems could be solved with the transparency of public design, which should be a guide and example for private



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designs, while today there are brakes that increase hunger, unemployment, the gap between rich and poor, probably, wars and terrorism. If someone demonstrate that clean energy could be produced in fixed and mobile version with very low costs, using water and air, even at the poles, what sense would have the current economic power wars and the speculation on energy sources and special materials?



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