

5. Innovative Idea

Now all the above methods which are suggested above have their limitation too. The main consideration that should be taken up for energy storage is low price per kWh, high efficiency and small footprint. These three factors help in providing cost effective system for storage purpose and an environmental friendly system. The batteries have high efficiency which comes to 90 percent but has disadvantages of low price per kWh which comes to \$200/kWh and a small footprint. The power to gas conversion method provides advantages of a small footprint and also low price per kWh but the efficiency of it is very less as it comes to only 25%. The pumped hydropower system has advantages of low price kWh and a high efficiency but they have a small footprint. Hence we see that each of the above system has disadvantages along with their advantages. As the energy demand is continuously increasing, it is required that the disadvantages of above system should be removed and a new system be adopted. Here we have a new system which can be adopted to provide a better energy storage equipment.

6. Hydraulic Hydro Storage Self Powering Storage System

Hydraulic hydro storage self powering and storage system is the one in which the renewable energy can be stored for a much longer time than we can at present. Present storage capacity is just half an hour. Which is much lesser than needed. Presently the systems we have can generate renewable energy for instant use only what our system is suggesting is making use of the energy generated for the instant use as well as storing it for a much longer time say even some days and the system has a provision for storing the energy generated and using it to power distant places. In this system we convert the electric energy to kinetic energy that will be stored as potential energy and will be stored in high efficiency special batteries.

In this system we use the reversal of a hydro power plant. In hydro power plant we store the energy as potential energy in form of water which is stored uphill. This is highly efficient upto 80% but it has its foot prints on nature and the places nearby are completely disrupted.

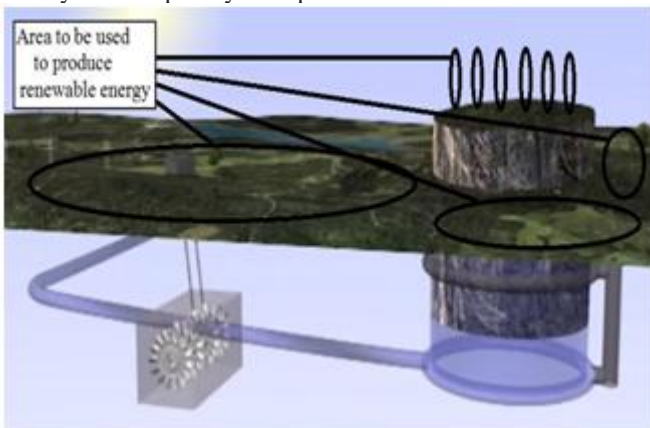


Figure 5: Proposed Idea

In hydraulic hydro storage system we will be storing the water underground rather than storing it uphill for this

purpose an ground will be cut and the water through a turbine will take the water under the rock cut. and the water will uplift the land which has been cut so the land which comes up is the storing house now. Whenever we need power just take the cut mass of land down and it will re-power the water and power will be generated

So our system now is an mirror image of the hydro power systems. What we do is take an area that equivalent to the circle of 500mts and then we cut that area through rocks to the height of 1 km downwards. The mechanical system used to cut down the rocks is an advanced system causing no disruption to the area nearby. The cutting through the rock is done by using sawing strings. Before cutting through rocks we will place a shaft into the ground that goes into ground 1.1km deep and will have 2 tunnel systems. One tunnel will be placed at half the height and other will be near the ground. Tunnels will be used to hold the rock when it will be risen up.

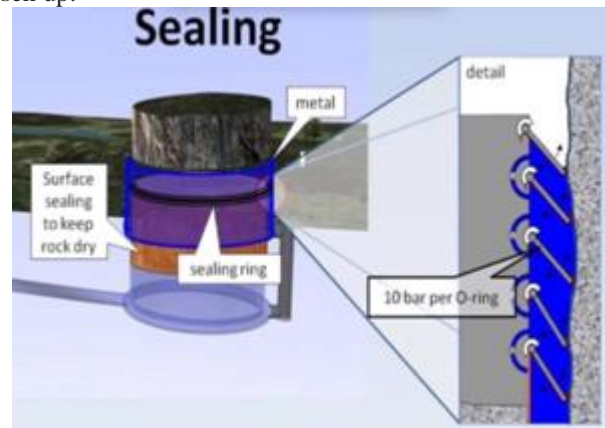


Figure 6: structure description

In this system we use an area of say 8 kilometres out of 8 km we use 1km for the storage of water. So the cut mass will basically have just two positions first will be when the water will be under the land mass and it will be held there by the tunnel system we are using. The tunnel system has a provision that it holds the land mass efficiently in its place where the water is under it. Then when the rock is left off move down and pump up the water through the external structure. Now again the same water structure is used to hold the land mass in the final place. The tunnel system has the extended rings in it which holds the land mass in its proper positions without fail. So the water will be sent under ground using the renewable energy through a pump so basically we use the renewable energy produced to pump water under the cut land mass. now whenever needed the rock will be allowed to move down freely which will start pushing up the water through a turbine. Now here the working is same as that of a traditional hydro power plant.

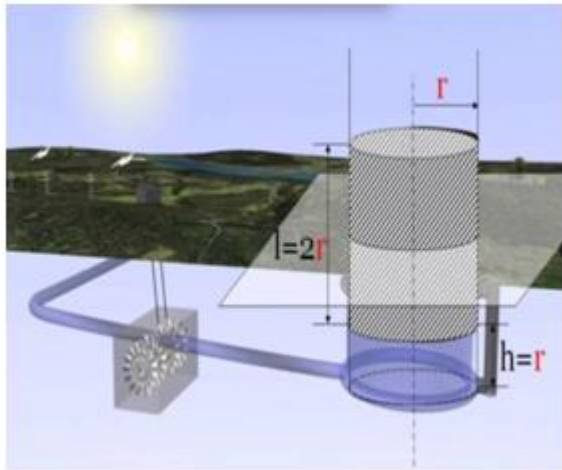


Figure 7: hydraulic hydro system

From where does the renewable energy will come. Well it will be coming from the around are which we are using to install solar cells and wind mills. In our system we are making the best use of our place which is present over the land mass cut. So this place will be used to place as many wind mills as possible. Whenever the landmass comes down or goes up making the wind mills to move and generate energy at there best rate. So the area we take under consideration is 8 km and out of it only 1 km is enough for the land mass system. The other 7km will be used for the renewable energy production. So our system is generating its own renewable energy and using it to set the power to store in form of potential energy under the cut mass land. We don't leave it here now this system will be capable of producing instant power in nights or any other time of crisis. But what about the daytime and the other free times. This system will be operating as frequently as possible but what will be we doing with the energy produced now? We will be storing all of that energy in the highly efficient above mentioned vanadium redox batteries. Now this system is generating its own renewable energy to be used, generating power whenever needed and providing the stored power in form of batteries.

So our system takes care of all the aspects necessary for it to be much better than any other present. Now why this system is better than what we have? Answer is that it provides us a method to store the renewable energy for any amount of time we need. preferred Location of our system would be barrened but even if it is not the barrened, it will just do fine. How efficient is this system? These are some relations to express the efficiency.

Mass (M) is proportional to (Radius(R) to the power 3)
 Height(H) is proportional to (Radius to the power 3)
 That makes,
 Energy is proportional to (Radius(R) to the power 4)

So, making the landmass to work in one full cycle will give an profit of atleast 160million\$. This figure is enough to express the efficiency.

7. Limitations

The system is having a little more of an expensive installation cost but as soon as it starts working the expenditure would be regained again. Water storage area

would be needed for the proper operation of the system but it won't be needing any special mountainous area. A natural water body will be fine and it won't disrupt the functioning of the water body as measures for it can be applied easily. Proper care has to be taken while cutting through rocks and the tunnel structure to hold the landmass in its place has to be very precise and the engineering has to be done innovatively so the misshappenings can be avoided. but if everything is done as planned the structure would be as profitable as there never have been.

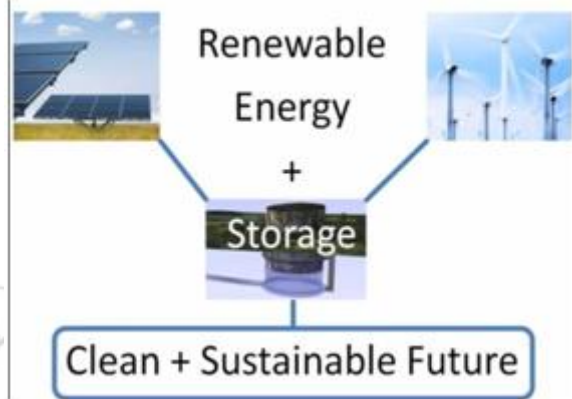


Figure 8: Description of idea

8. Conclusion

In 2030 the energy demand is going to increase to 10,000,000MW. Hence there is a crirical need to shift our concentration to storage systems of renewable energy systems. The main focus of this paper is to provide an efficient way to implement and provide some alternate implementation schemes for the above suggested methods. The authors have pointed the urgent need for implementation of the alternative storage schemes such as the use of Hydraulic hydro storage, Pumped hydro power plants, power to gas conversion and vanadium redox batteries. Energy is an indispensible element for human survival. Hence there is a need for better methods of energy storages and hydraulic hydro storage self powering storage system provides an efficient method of energy storage and needs to be adopted instantly.

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