Portable Solar Powered Water Purifier

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Abstract- *In our country many people face problem of drinking pure water and so many people do have water purifiers in their home, but if we see in the rural areas there are no purifiers or less purifier and the supply of electricity is rarely available and we can also see the problem of energy crisis, so to overcome this problem our team will be working on a solar portable water purifier. The purifier will be using renewable source of energy i.e solar energy and when in the absence of solar energy it can also work on electrical energy and the purifier will be portable so we can move it very easily*

I. INTRODUCTION

In India, many people get ill due to waterborne diseases and the water is unfit to drink as it contain many dangerous contaminants like aluminium , ammonia , arsenic , barium , cadmium , chloramine , chromium , copper etc . so the underwater is unfit and if we look to the rivers many of the industries release their harmful waste, chemicals in the river so it is well unfit to drink. So there is a must of having a water purifier but due to high purifier rates many people can afford and many people in rural areas do not get the supply of electricity, and our respected Indian army soldiers has to be on the places where they cannot find proper fresh water so the purifier will be portable and they can carry the purifier very easily with them and can use whenever needed.

II. PROPOSED SYSTEM

We have proposed this system for the development of a sustainable water purification system which is relatively easy to manufacture and maintain while relying on solar energy. This project will reduce the bill consumed by the normal purifier by using renewable energy , we know there the conventional source is depleting day by day, so this project can be very useful in many terms. The idea to make it portable is that if anyone wants to go on a place where the person cannot find fresh water by the means of the project he can purify the water and can use it.

It can be carried at places, because of its lightweight and portable design.

It has a very simplistic design as its basic principle is fairly easy to understand.

Since it uses UV rays, it purifies water individually at about 70-80% clean, in addition to this it also uses UF filter which increases its purity.

IV. OBTAINED DATA AND OBSERVATIONS

EFFICIENCY

The following Data was obtained after operating the project. The Maximum capacity is given based on results obtained after ideal conditions. Their is almost no waste products after purification except the dirt particles filtered out.

Data	Per Minute
Maximum Capacity	1.8 L
Average	1 L

CONDITIONS

There are few conditions that are needed to be observed for ideal and optimal output. It is mainly about the temperature of water and the pressure. Temperature more than the suitable temperature can damage the internal system or decrease its life and efficiency. Same applies for pressure.

Condition	Maximum
Temperature	100°F
Pressure	120PSI

OBSERVATION

It is observed that under ideal conditions the Purifier shows excellent efficiency and excellent purification. If the conditions given above are violated, it causes the system more load hence decreasing its capacity and efficiency. The water obtained is as pure if not more, than the water we drink at our house. If the efficiency and working capacity is needed to be increased, parts of more magnitude must be used.

BUDGET

Construction

Description	Quantity	Unit Price	Cost
Solar Panel	1	₹ 1,235	₹ 1,235
Carbon Filter	1	₹ 250	₹ 250
UV Filter	1	₹ 599	₹ 599
Sediment Filter	1	₹ 250	₹ 250
U.F. Membrane	1	₹ 300	₹ 300
Switching Board	1	₹ 400	₹ 400
AC to DC Converter	1	₹ 400	₹ 400
Total			₹ 3,434

The project can be made more cheaply if made in mass numbers.

V. PROJECT MODEL AND IT'S WORKING

The project model is made by seven individual parts, namely Solar panel, UF membrane, Sediment filter, Carbon filter, UV filter, AC to DC converter, Switching board and a Suitcase protecting the system and making it easy to carry anywhere. The model has one input and one output.

The solar panel and switching board are connected with the help of wires through which the generated electricity is directed and stored. The stored electricity is used to run the attached filters to purify water.

INTERNAL STRUCTURE

The internal structure consist a system containing all the filters, converter and switching circuit.

All the parts are connected together with the help of wires and the current flowing through them is directed and controlled using switching circuit.

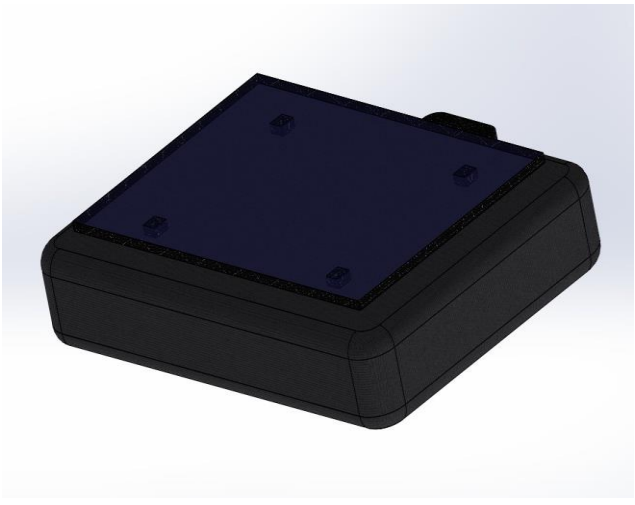
The solar panel when exposed to sunlight generate electricity which is stored in the battery. Then when needed, we can turn on the filter and purify water by pouring it in the input value. The water is passed through UV, UF, sediment and carbon filter. The filters kill harmful bacteria and filters out the unnecessary components of water. The Purified water is received by the output value.

VI. EXTERNAL STRUCTURE

The water purifying system is enclosed in a tough suitcase. Solar panel is attached to one side of the suitcase. The suitcase makes the whole system more stable and more protected. It also makes it easier to carry anywhere we want and get clean water to drink. Therefore it expands the scope to which this project can be used, like army, life kits and natural disasters affected areas.

It adds a solid frame to the filter and makes it easy to use.

The 3D model :-



VII. IMPROVEMENTS SUGGESTED BY GUIDE

The following improvement(s) are suggested by the Guide after going through the project.

The project model can be made more lighter.

- Due to the battery and other internal parts of the system, the project becomes a bit heavy and might be difficult to carry around. Additionally the outer protective case adds more weight to the system.

So, using lighter material one more compressed parts with high efficiency could be used in the future.

VIII. CONCLUSION

Water is one of the biggest problem in many places worldwide. So a project as a effort to cause a change was important to make. Solving a major problem in a environmentally friendly way was the core of the thought process put behind it.

We have also tried to make the project as practical as possible. Also many efforts are made to make it as cheap as possible. The project works perfectly and has balanced structure to it.

IX. ACKNOWLEDGMENT

This project is made in a way to solve real life problem which are faced on many occasions in many places. From regions facing poverty to regions facing environmental crisis, this project can be helpful in many ways. It also has huge future scope and space for advancements and innovations. While making this project it is made sure that no harm to the environment is caused and is safe for usage. Ultimately the project solves a important problem in a environmental friendly way.

REFERENCES

[1] We have referred this project from research gate.net