SOLAR POWERED POTABLE NON-RO WATER PURIFIER

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Keywords:

A solar powered portable non-RO water purifier is an innovative solution designed to provide clean drinking water in remote or off-grid areas. Unlike traditional RO systems, this non-RO water purifier retains essential minerals while effectively removing harmful contaminants. Its portable design makes it ideal for outdoor activities, emergency situations, and rural locations. Powered entirely by solar energy, it operates without electricity, making it both eco-friendly and cost-effective. In this sustainable water purification system is perfect for those seeking mobility, independence from the power grid, and safe drinking water without the drawbacks of reverse osmosis.

Introduction:

In our project Access to clean drinking water is vital, yet still a challenge in remote and disaster-affected areas. A solar-powered portable non-RO water purifier offers an eco-friendly, electricity-free solution, ideal for off-grid use. Its lightweight design ensures easy transport, while effectively removing bacteria, viruses, and sediments without wasting water or removing essential minerals. Perfect for outdoor activities, emergencies, and rural use, it promotes sustainability by reducing plastic use and power reliance. This user-friendly purifier is valuable for families, travellers, and relief agencies, ensuring safe water anytime, anywhere

Objectives:

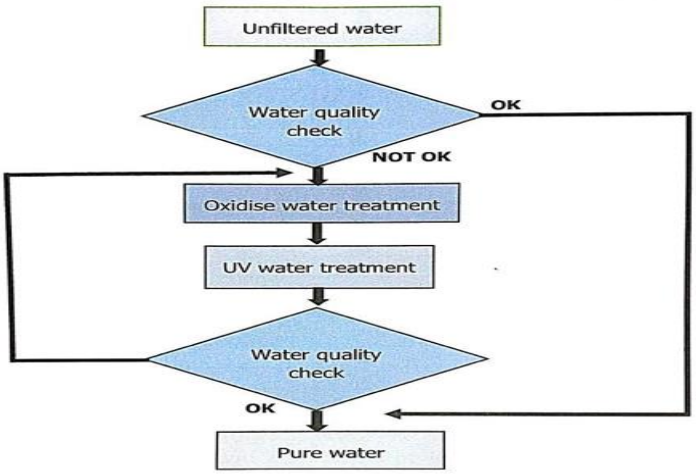
- Provide access to safe and clean drinking water for communities in need, reducing the risk of waterborne illness.

- Disadvantages of RO methods like wastage of water, removal of useful minerals are rectified by treating the water using non-RO methods like UV method, Carbon-oxidised methods are used.
- Increase energy efficiency by utilizing solar power, reducing reliance on non-renewable energy sources.
- Conduct testing and validation to ensure the purifier meets international water quality standards.
- Develop a user-friendly and maintainable system for easy operation and maintenance.

Methodology:

1.Flow chart

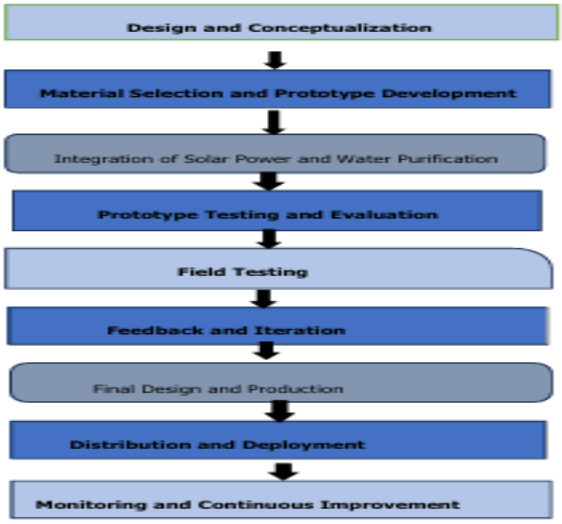
The purifying water, it starts with unfiltered water going through a water quality check. If the water is already clean, it is directly considered pure and ready to use. However, if the water quality is not good, it goes through two treatment steps: first, an oxidation treatment to remove harmful substances, and then UV treatment to kill bacteria and viruses. After these treatments, the water goes through another quality check. If it passes, it is declared pure water. If it still does not meet the required standards, it loops back for further treatment. This process ensures that only clean and safe water is delivered at the end.



2. Project flow

- Design & Conceptualization: Idea development and requirement planning.
- Material Selection & Prototype: Choosing materials and building a working model.

- ❖ Solar & Purification Integration: Combining solar power with water purification.
- ❖ Prototype Testing: Testing in controlled settings to assess performance.
- ❖ Field Testing: Real-world testing in practical environments.
- ❖ Feedback & Improvements: Gathering input and refining the design.
- ❖ Final Design & Production: Creating and producing the final version.
- ❖ Distribution & Deployment: Delivering and setting up the product.
- ❖ Monitoring & Improvement: Ongoing checks and enhancements for long-term use.



Results & Conclusions:

Result

A solar-powered portable non-RO water purifier uses solar energy for purification, relying on methods like UV sterilization, activated carbon filtration, and mechanical filtration instead of reverse osmosis (RO).

1. UV Purification: Uses UV light powered by solar energy to kill bacteria, viruses, and pathogens.
2. Activated Carbon Filtration: Removes chemicals, chlorine, and bad Odors, enhancing taste and safety.
3. Mechanical Filtration: Filters out large particles and sediments from the water.

Conclusion

The solar-powered portable non-RO water purifier is an eco-friendly and practical solution for safe drinking water in remote or off-grid areas. It runs on renewable solar energy, making it sustainable and cost-effective with minimal operating costs. Lightweight and portable, it's ideal for general purification needs, though it may not remove all contaminants like RO systems. Its effectiveness depends on the type of water impurities present.

Project Outcome & Industry Relevance:

- Clean Water Access: Ensures safe drinking water in areas lacking reliable infrastructure.
- sustainability: Uses solar power, reducing dependence on fossil fuels or electrical grids.
- Portability: Easy to transport for remote locations, disaster zones, or outdoor activities.
- Cost-Effective: Solar energy and non-RO methods (e.g., filtration, UV sterilization) lower costs compared to traditional RO systems.
- Durability: Built to withstand harsh outdoor conditions for long-term use.

Working Model vs. Simulation/Study:

The solar-powered portable non-RO water purifier project involves creating a physical working model rather than a theoretical study. The prototype uses solar energy to power non-RO purification methods like filtration, UV sterilization, or activated carbon. The model is tested in real-world conditions to assess portability, efficiency, durability, and cost-effectiveness, ensuring it can be used effectively in rural areas, disaster zones, or outdoor settings to provide clean drinking water.

Project Outcomes and Learnings:

1. test the quality of water
2. It filter the water in using non-RO method

Future Scope:

- Advanced Filtration: Use of efficient filters like nanotech and UV-C LEDs for better purification.
- Smart Monitoring: IoT features for real-time tracking of water quality and system status.
- Community Scalability: Larger models to serve groups like schools or relief camps.
- Portable Design: More compact, lightweight, and foldable for easy transport.
- Better Solar Efficiency: High-efficiency panels and storage for low-light performance.
- Multi-source Input: Ability to purify water from rivers, rain, or mildly salty sources.
- Eco Materials: Use of biodegradable or recyclable components.
- Device Integration: Can also power or charge other devices in emergencies.
- Cost-effective Production: Affordable designs for wider access in developing areas.
- NGO/Government Support: Broader distribution through partnerships with aid organizations.