SOLAR POWERED WATER PURIFIER

Made by Ishaan Avi Gupta

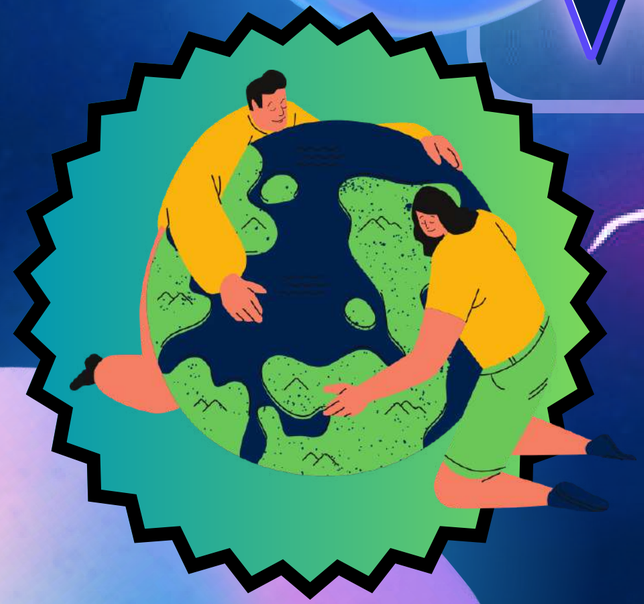


TABLE OF CONTENTS

PROBLEM STATEMENT:

HOW CAN I PROVIDE ACCESS TO CLEAN DRINKING WATER TO KILOKARI VILLAGE?

ABOUT US

- Our project's aim is to provide sustainable access to clean and drinkable water for remote villages in Delhi, India.

- We are utilizing a solar-powered water purifier which uses the chlor alkali process to remove impurities present in the water.

- Our goal is to provide a long-term solution for the water scarcity problem that many remote villages in Delhi face, and to create a sustainable source of clean water for their daily needs.

MISSION AND VISION

MISSION

- To provide clean and drinkable water to remote villages in Delhi using sustainable and eco-friendly technology.
- To improve the health and well-being of the people living in these communities by reducing the incidence of waterborne diseases caused by contaminated water.
- To promote awareness about the importance of clean water and sustainable practices for the benefit of future generations.

VISION

- To create a world where access to clean and safe water is a basic human right, regardless of geographical location or economic status.
- To inspire and empower individuals and communities to take action towards sustainable living and responsible resource management.
- To foster a culture of social responsibility and environmental stewardship through collaborative partnerships and community engagement.

GOALS AND OBJECTIVES

Objective n° 1

1. Enhance access to clean and drinkable water by installing at least 10 solar-powered water purifiers in remote villages of Delhi and Noida by the end of the year.

Objective n° 2

2. To monitor the effectiveness of the water purifiers and collect data on the reduction of waterborne diseases, as well as the impact on the environment, with the goal of continuous improvement and optimization of the system.

Objective n° 3

3. Provide education and training to local communities on how to operate and maintain the solar-powered water purifiers, empowering them to take charge of their own water supply and improve their quality of life.

COMMUNITY IMPACT OF THE PURIFIER

- Empowerment: By training local people in the operation and maintenance of the purifiers, we aim to empower the community to take ownership of the project and become self-sufficient in ensuring access to clean and drinkable water.

- Health: By providing clean and safe water, we aim to improve the health and well-being of the people living in remote villages in Delhi.

- Sustainability: By using sustainable and eco-friendly technology, we aim to promote responsible resource management and environmental stewardship.

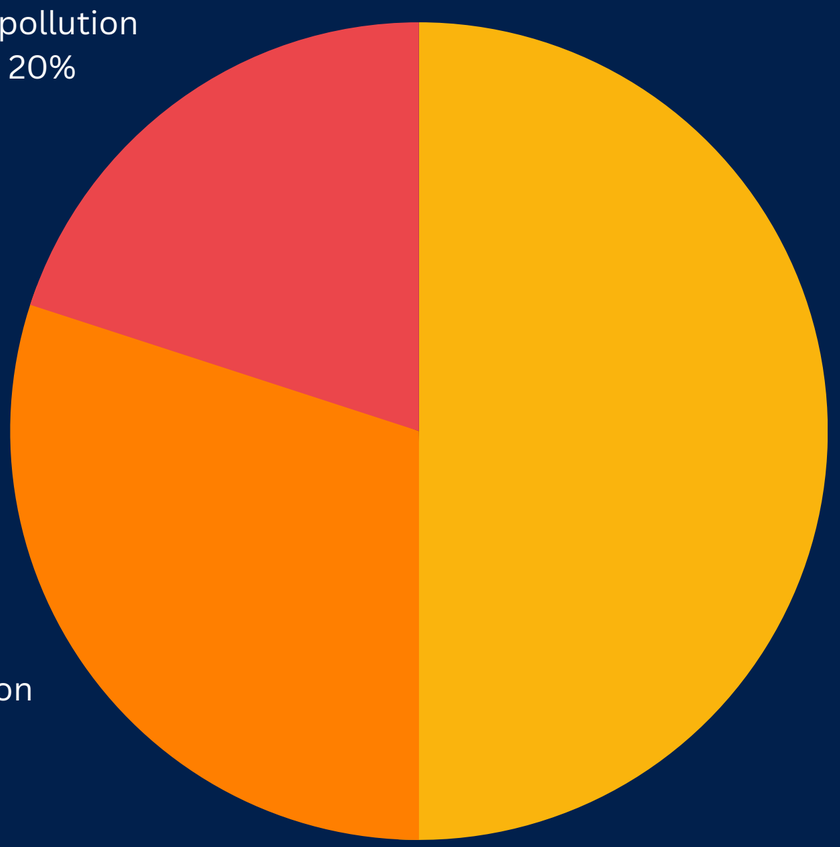
VALUE PROPOSITIONS

- Our solar-powered water purifier provides a cost-***effective*** and ***sustainable*** solution to the problem of contaminated water in remote villages, improving the health and well-being of the residents.

- The use of the chlor alkali process with aluminum sheets eliminates the need for harmful chemicals or expensive equipment, making it ***accessible*** to even the most disadvantaged communities.

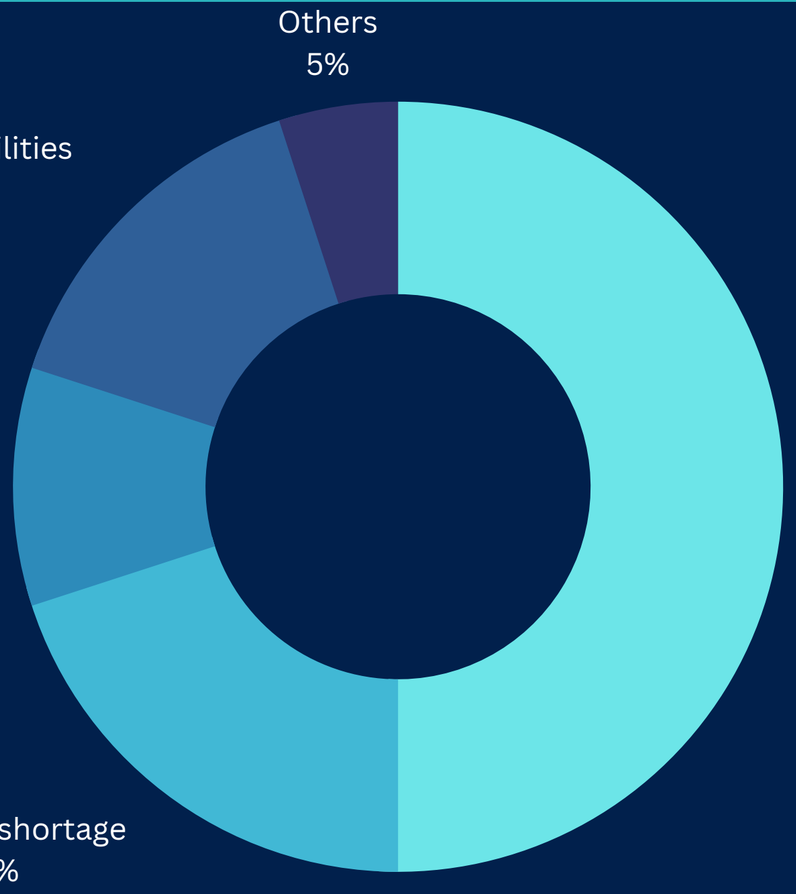
- Our project promotes ***environmental sustainability*** by using renewable energy sources and reducing the use of plastic water bottles, aligning with our commitment to responsible resource management and a better future for all.

STATISTICS: NATIONAL POINT OF VIEW



- India is facing a severe water crisis, with 50% of the population experiencing high to extremely high water stress, according to the Composite Water Management Index (CWMI) report by the Niti Aayog.
- In addition to scarcity, the quality of available water is also a major issue, with 70% of India's surface water being contaminated, according to a report by the Central Pollution Control Board (CPCB).
- The water crisis not only affects human health and well-being but also has significant economic implications, with a World Bank report estimating that India loses 6% of its GDP due to water-related issues.

CUSTOMER INTERVIEWS

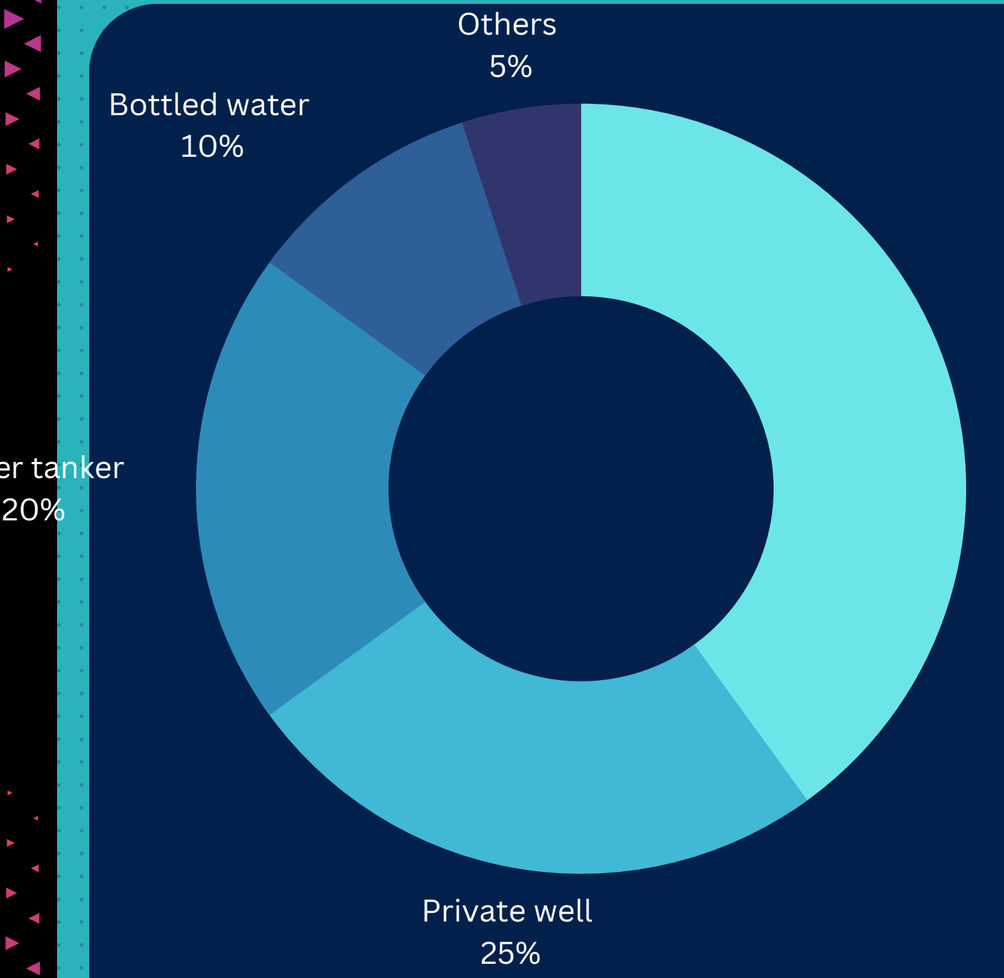


- I had customer interview with 50 villagers and here are the results.

What is the most pressing problem that your village is currently facing?

- Water scarcity
- Electricity shortage
- Poor road infrastructure
- Lack of healthcare facilities
- Others

CUSTOMER INTERVIEWS



- I had customer interview with 50 villagers and here are the results.

How do you currently access drinking water in your village?

- Public tap
- Private well
- Water tanker
- Bottled water
- Others

EARLY MODEL DESIGNS

MODEL PROGRESSION

COMPONENTS

No.	Item	Quantity	Price / Unit	Price	Specification
1	Sensor Solar Panel	3	500	1,500	5 W / 9V
2	Solar Panel (Electricity Generator)	1	10,800	10,800	250W / 12 V (1346 X 986 X 40 mm)
3	DC Geared Motor	1	1,380	1,380	DC / 3.5 RPM
4	Voltmeter	1	350	350	Measure Voltage of Battery
5	Bearings	2	500	1,000	F204
6	Steel Shaft	1	200	200	20 mm Diameter, 16 inch length
7	Fabricated Steel Stand	1	1,500	1,500	
8	Charge Controller	1	4,200	4,200	12 Volts
9	Battery	1	6,800	6,800	12 Volts DC 80 AH
10	Invertor (DC to AC Convertor)	1	7,000	7,000	12 Volts / 300 VA
11	Electrical Wire	1	270	270	
12	Aluminium Sheets	2	100	200	
13	Water Tank	1			

KEY FEATURES

- Automated Tracking System
- Solar Panel directly facing the sun at all times
- Increased efficiency even on cloudy and dusty days
- Reduction of the annual energy consumption and generation of monthly savings
- It is maintenance free, only daily cleaning of the solar panel is required
- The life of a good battery is almost 5 years, and for the rest of the components it is 10
- Recovery of initial investment cost of ₹35,000 per installation is within one year

MECHANISM

- Intake - Water from a natural source such as a river or lake is drawn into the purifier.
- Chlor Alkali Process - The chlorinated water then flows into a chamber containing aluminum sheets, which are connected to an electrical source powered by solar panels. The aluminum sheets undergo a process called the chlor alkali process, which converts the chloride ions in the water into sodium hydroxide (NaOH) and hydrogen gas (H2). This process releases hydroxyl ions (OH-) into the water, which combine with any remaining impurities in the water to form a sediment.
- Sedimentation - The water is then left to settle, allowing the sediment to sink to the bottom of the purification chamber.
- Collection - The clean water is then collected from the top of the purification chamber and is ready for consumption.

VILLAGE TESTING (IN PROGRESS)

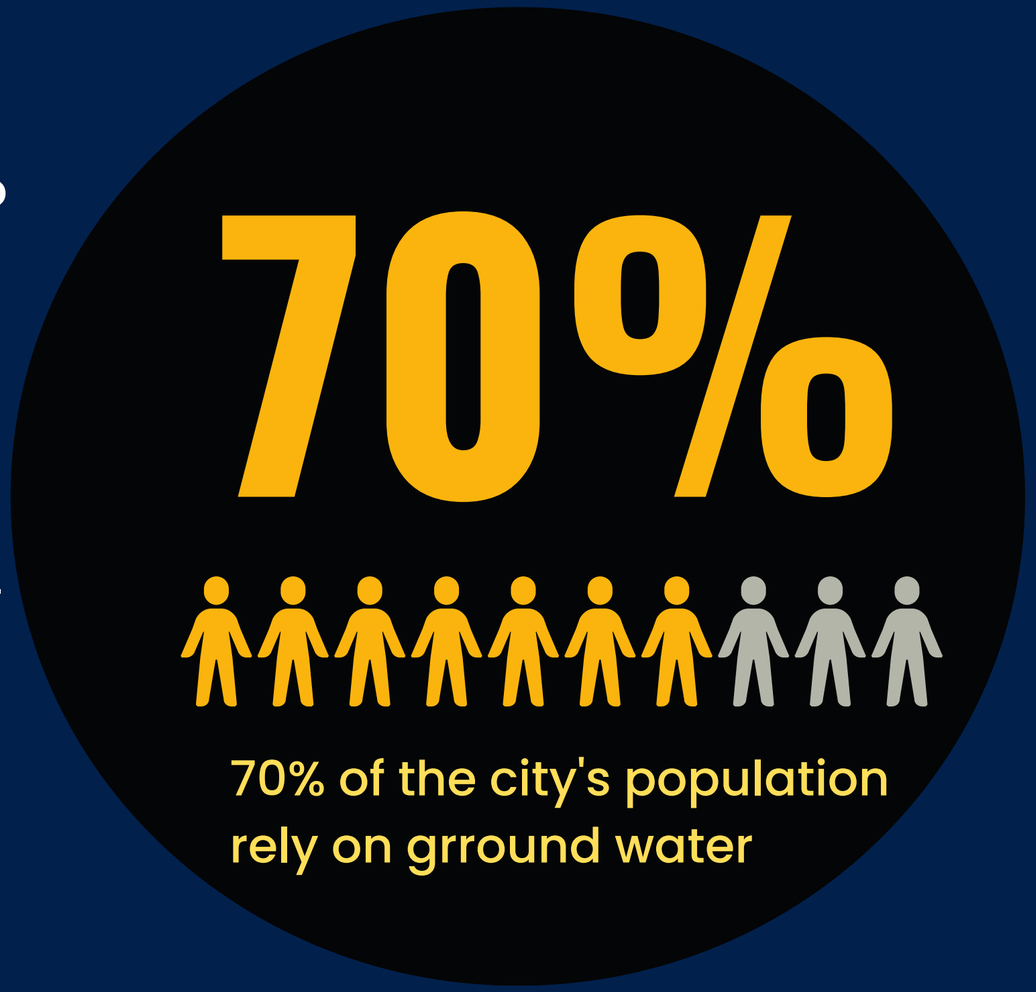
To perform the performance testing for the solar-powered water purifier, we are conducting various techniques listed below:

- Water Flow Rate Testing
- Turbidity Testing
- pH Testing
- Chloride Ion Testing
- Total Dissolved Solids (TDS) Testing
- Bacteria Testing

STATISTICS

- High levels of groundwater depletion: Delhi is among the top ten Indian cities that are at the highest risk of running out of groundwater due to excessive usage, with nearly 70% of the city's population relying on groundwater. (Source: NITI Aayog, Composite Water Management Index 2019)

- Unequal access to water: Despite being a water-scarce region, water supply in Delhi is highly inequitable, with nearly one-third of the city's population lacking access to piped water supply. (Source: Delhi Jal Board)



FUTURE SCOPE: STRATEGIES

1. Scaling up: Expanding the reach of the project to cover more remote villages in Delhi and beyond, thereby increasing access to clean and safe drinking water for more people.

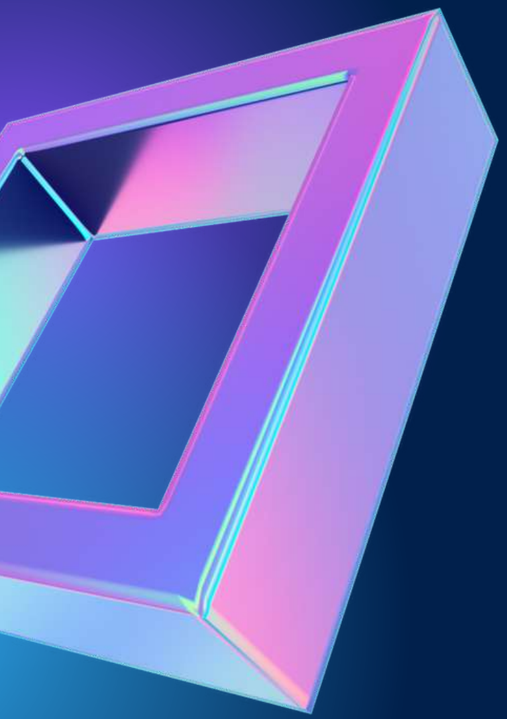
STRATEGY N°1

2. Innovation: Continuously exploring new and innovative ways to improve the design and efficiency of the water purifier, such as incorporating artificial intelligence, IoT technology, or sustainable materials.

STRATEGY N°2

3. Collaborations: Partnering with local NGOs and government agencies to leverage their networks and resources, and to promote sustainable community-led solutions for water and sanitation issues.

STRATEGY N°3



THANK YOU