GREY WATER TREATMENT FOR CAR WASHES

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PROBLEM STATEMENT

Developing an innovative and sustainable system for recycling and treating grey water at car washes with using only filters to minimize water loss, reduce environmental impact, and promote responsible water conservation in the car wash industry.

CONSTRAINTS

1- Energy efficient technologies and optimizing the overall system design

2- Minimizing wasted water

3- Cost-effectiveness in installation and maintenance

TARGET SPECIFICATIONS

- pH in regulation with MEWA's standards (6-8.4)

- Total Suspended Solids less than 10 mg/l

- Hardness less than 100-500 mg/l

- Recycle 75% of Greywater

PROJECT IMPACT

Environmental Impact:
Mitigate water scarcity and conservation of energy.

Economic Impact:
Market opportunities and increased efficiency.

PROTOTYPE DESIGN

- Utilizes an Ultrafiltration system to clean and reuse wash water.
- Harnesses solar energy to power the car wash machinery.
- Employs an automatic transfer switch to ensure uninterrupted operation.
- Reduces environmental impact, lowers operating costs.

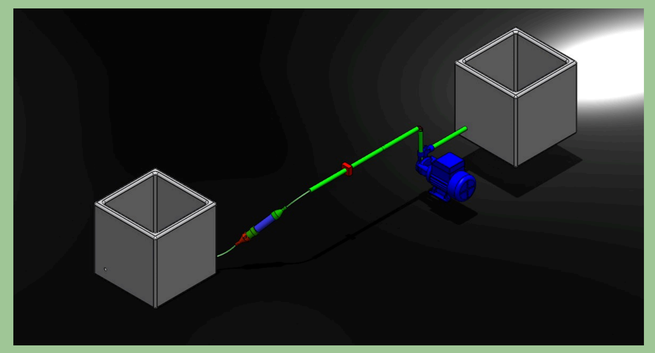

Figure 1. Prototype design

PH LEVELS

We conducted frequent pH tests on the water used in the car wash process to ensure compliance with MEWA's standards. These tests were performed using accurate and calibrated pH meters and we found the pH level to be close to 7.2 which is in the range set by MEWA.

TSS (TOTAL SUSPENDED SOLIDS)

Throughout our testing, we conducted regular assessments of Total Suspended Solids (TSS) in the water used within our car wash system. Our findings consistently showed that the TSS levels remained below 10 mg/l, meeting the specified requirement outlined by the project's standards.

TDS (TOTAL DISSOLVED SOLIDS)

We tested the hardness of the water using a water testing kit designed specifically for measuring mineral content and found that its hardness was always between 100-500 mg/l, ensuring accurate results for our project's compliance assessment.

WATER TREATMENT RATE

We measured water usage during car wash operations and tracked recycled water volume over a specified period. We then calculated the capture efficiency as:

$$\eta_{capture} = \left(\frac{\text{Volume Of Recycled Water}}{\text{Total Water Usage}} \right) \times 100\%$$

$$\eta_{capture} = \left(\frac{78}{100} \right) \times 100\% = 78\%$$

Figure 2. Capture efficiency formula

QUALITY CONTROL CHART

A fundamental tool in quality management and process improvement. It contributes to the effective control of processes, reduction of defects, cost savings, and the enhancement of product and service quality to ensure meeting targeted specifications

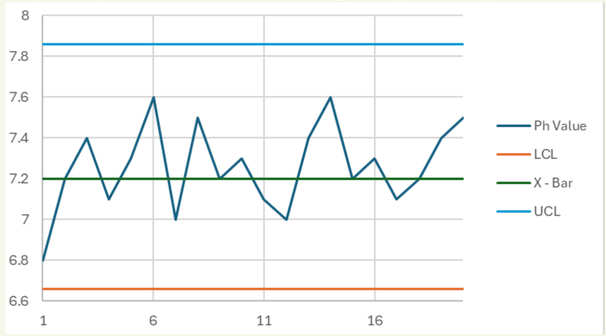

Figure 3. Quality control chart

CONCLUSION

To conclude, Innovative solutions are crucial in addressing environmental challenges, and our project embodies this spirit. By combining solar power with water recycling and smart energy conversion technology, we've created a sustainable model for car wash operations.