



King Fahd University Of Petroleum & Minerals

Capstone 2.0

AquaRoam

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Elevator Pitch & Problem Statement

Access to water can be challenging in various areas around the world, and our project makes water drinkable for human consumption in harsh environments.

Introduction

- As the global demand for fresh water intensifies, our mobile desalination system provides a vital solution. Employing advanced reverse osmosis technology, this portable unit efficiently converts seawater into clean, drinkable water. Developed to support regions with limited water access, our system ensures a dependable supply of high-quality water, essential for both daily life and emergency scenarios. Embrace a future where sustainable, safe, and accessible water is a reality for all.

Constraints

- Cost Constraint:** Balancing cost-effectiveness with performance is crucial to ensure the device's affordability and accessibility so budget limitations may impact the selection of materials, technologies, and manufacturing processes.
- Water Output Rate:** Rapid desalination may require a lot of energy, while a slower process may limit the practicality of the device in emergency situations. So, achieving a balance between the water output rate and the efficiency of the desalination process is challenging.

Objectives

A mobile desalination system is being developed to efficiently convert seawater into drinkable water, aiming for at least 10 liters per hour. Powered by renewable energy, the system will minimize environmental impact and ensure water meets health standards, supporting emergency responders and communities with reliable water access.

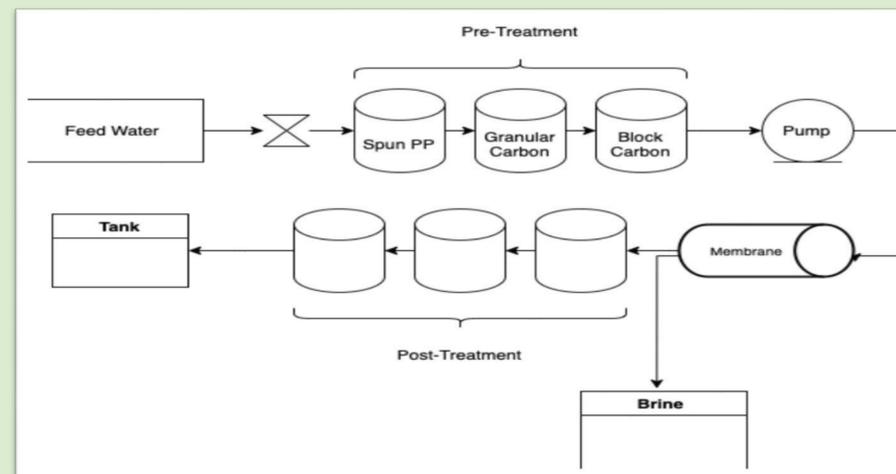
Specification

Our target specification is shown in the table below:

Constituent	Target Level
Desalination Capacity	10 L/h
Produced Water Quality	(6.5-8.5 pH) (30-60 ppm)
Portability	<40 kg
Cost Effectiveness	7k SAR

Prototype Design

The following drawing shows the process of the final prototype design.



Validation

Our project focuses on meeting and surpassing pH standards set by the Ministry of Environment & Water and Agriculture while ensuring producing an efficient output rate with the given cost constraint. The following table shows the targeted specifications and our results.

Specification	Targeted Value	Results by Testing
Capacity	10 L/h	12 L/h
Water Quality	6.5 - 8.5 pH	7.3 pH
Weight	50 kg	48.8 kg
Cost	7000 SAR	5980 SAR

Project Impact

- Economic Impact:** Our mobile desalination system opens new markets and creates jobs, making clean water access cost-effective and economically beneficial.
- Societal Impact:** We enhance community well-being and stability by providing reliable, equitable access to safe drinking water, improving public health and social cohesion.

Conclusion

Our innovative mobile desalination system, utilizing cutting-edge reverse osmosis technology, effectively transforms seawater into safe, drinkable water. Designed for ease and efficiency, this portable solution addresses the urgent need for reliable water sources in regions facing water scarcity. As we continue to refine and enhance our system, we remain committed to advancing sustainable water solutions for communities worldwide.