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KFUPM Design Expo

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Problem statement

Introducing a compact water treatment device designed for both civil and commercial applications. The device processes facility sewage water, transforming it into water suitable for various applications. Its standout feature is installation flexibility, seamlessly integrating into new constructions or ready-made structures. Operating under government-approved standards, the device provides a cost-effective alternative, reducing environmental impact and water bill costs.

Background

In response to the global need for effective and sustainable sewage water treatment, our senior design project endeavors to develop a cutting-edge compact water treatment device. By leveraging advanced technologies and innovative design principles, our solution aims to revolutionize sewage water treatment for civil and commercial applications, offering enhanced efficiency and environmental compatibility.

Specifications

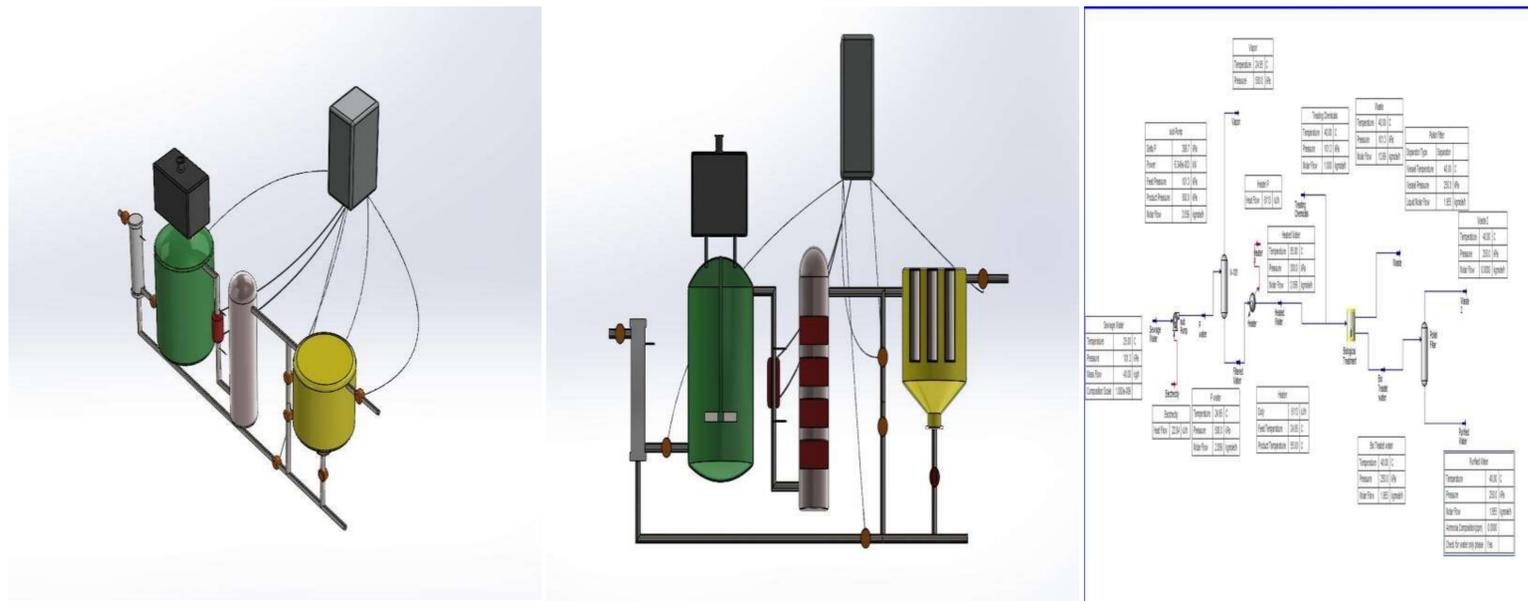
Table of specification

Flowrate	300	L/hr
Turbidity	0.5	NTU
Conductivity	1.0	%
Degree of Purity	99	%

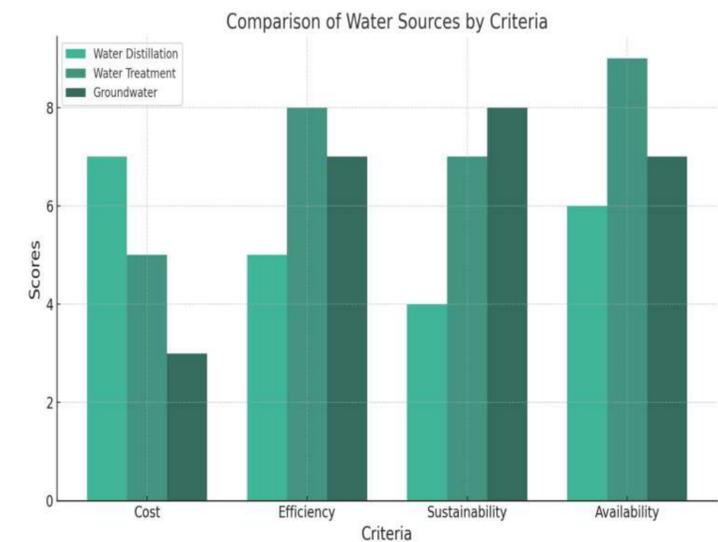
Constrains

- High energy consumption
- Finish in four months
- Governmental and environmental regulations
- Data acquisition
- Budget is from 6000 to 15,000 SAR

Simulated and prototype Design



Comparison of water sources Type



Testing & Validation

Replication	Arrivals/hour	Replication	arrivals/hour	minutes	Average Delay (minutes)
1	51	1	51	1.07	2.79
2	40	2	40	1.12	1.12
3	45.5	3	45.5	1.06	2.24
4	50.5	4	50.5	1.1	3.45
5	53	5	53	1.09	3.13
6	49	6	49	1.07	2.38

Since $|t| = 5.34 > t_{0.025,5} = 2.571$, reject H_0 , and conclude that the model is inadequate in its prediction of average customer delay.

Project impact

The project's impact lies in revolutionizing sewage water treatment through the development of a compact and versatile water treatment device. By providing efficient and sustainable solutions, it positively impacts industries, municipalities, and communities by promoting environmentally responsible practices, reducing water pollution, and ensuring reliable access to clean water resources. Ultimately, the project's impact extends to enhancing water management, mitigating environmental risks, and fostering a more sustainable and resilient future.

Conclusion

In conclusion, our senior design project focuses on the development of a compact water treatment device for civil and commercial applications. By addressing the pressing need for efficient sewage water treatment, our innovative solution offers versatility, integration flexibility, and cost-effectiveness. With its potential impact on various industries and sectors, our project aims to contribute to sustainable water management, reduce environmental impact, and provide reliable access to clean water resources. Through our efforts, we strive to meet the evolving demands of a water-scarce world and promote a more sustainable future.