

SPRING 2022-2023

GROUP MEMBERS

- SALIM MOHAMED (Energy Systems Engineering, undergraduate)
- IBRAHIM MODIBBO AHMED (Energy Systems Engineering, PhD)
- MOHAMMEDREZA KARIMIYANNASAB (Mechatronics Engineering, undergraduate)
- DAVID OTOSAWIE OGBEMUDIA (Energy Systems Engineering, PhD)

A solar water heater is a device that uses energy from the sun to heat water. It is an environmentally friendly and costeffective way to heat water, and it can be used in any climate. The solar water heater works by absorbing energy from the sun and transferring it to the water in the system.

Therefore, this project is important because it provides an environmentally friendly and cost-effective way to heat water.

Re-used/Recycled Materials:

- Plywood
- Glass
- Heat Pump

Other Materials:

- Glue
- Cellotape

- Foam Nails

SUSTAINABLE CAPSTONE PROJECTS (SCAP)

INTRODUCTION



MATERIALS USED IN CONSTRUCTION

Evaportating Coil Refrigerator door

• Hose pipes • Hose fitter

A final product Solar water heater has been designed and constructed. The solar water heater works by absorbing energy from the sun and transferring it to the water in the system. The system typically consists of solar collector, a storage tank, a heat transfer fluid, and a pump. The solar collector absorb energy from the sun and transfer it to the heat transfer fluid, which is then pumped through a heat exchanger. The heat exchanger transfers the heat from the fluid to the water in the storage tank, which is then ready to be used. The process is repeated as long as there is sunlight available to power the system.







SOLAR WATER HEATER

FINAL PRODUCT

Designing a solar water heater from reused materials shows promise in promoting sustainability and renewable energy utilization. However, there is room for improvement in terms of optimizing performance and scalability. One possible direction for improvement is exploring advanced materials and design modifications to enhance efficiency and heat retention. This could involve researching highly efficient absorber surfaces, improved insulation materials, and innovative design concepts such as heat exchangers or phase change materials.

Additionally, incorporating smart technologies and IoT connectivity could enable remote monitoring and control, while collaboration with recycling centers, research institutions, and local communities can provide valuable insights and support. Sharing knowledge through educational programs and open-source documentation would further encourage the adoption of sustainable solar water heating systems

Figure 3.Base (Fridge Door)



Figure 1. Solar Collectro Basek\ Design. **Figure 2**. Solar Collector(Evaporating Coil).



Figure 4.Laying Collector over Base

It's observed that the sun radiation is essential for the proper functioning of a solar water heater. The solar panels absorb energy from the sun's radiation and transfer it to the water in the system. This process heats the water and provides an environmentally friendly and cost-effective way to heat water. The sun's radiation is a free and renewable source of energy, which makes it an ideal choice for powering a solar water heater.



RESULTS AND DISCUSSION

CONCLUSIONS

REFERENCES

1. https://www.renewableenergyworld.com/solar-water-heaters/

2. Vasan, P., & Nithyavathi, K. (2021). Design and fabrication of solar water heater. International Journal of Mechanical and Production Engineering Research and Development, 11(3), 207-216.