

Solar Cooling



Abdullah Alhumaid (CHE) - Muhammed Almuhanna (CHE)
Fahad Aldaajani (ISE) - Nawaf Almutairi (ISE)
Ahmed Bokhader (EE)

INTRODUCTION

The project's objective is to design a renewable cooling system to lower the temperature in open areas, enhancing visitors' experience. The renewable cooling system aims to reduce the temperature from 40°C to 20°C. The process involves exchanging heat between water and air, cooling natural water with an absorption chiller powered by solar energy, and utilizing a heat transfer process to achieve our cooling objective. This sustainable approach promotes comfort and environmental responsibility.

PROBLEM STATEMENT

Countries such as KSA which are aiming to increase the number of visitors suffer from 6 months of high temperatures which is disturbing visitor experience therefore the number of visitors decreased to 50% due to high temperatures.

PROTOTYPE DESIGN



SPECIFICATION

- Target air temperature 20 °C
- The absorption chiller provides 10 L/min.
- The water pump provides 25 L/min
- Solar panel of 150 watts to function the pump & chiller perfectly.
- Fan flow 30 m³/min

CONSTRAINTS

- Resource availability
- Area Design
- Infrastructure
- Capital Cost

RESULTS

- The heat duty required for the heat exchanger was found to be 3.89 kW.
- The actual work required for the pump was found to be 0.08 kW.
- Solar panel of 100W with a Battery.

CONCLUSION

Our project aimed to use renewable energy to cool down high temperatures while being cost-efficient. While using renewable resources such as water, and solar energy with synergy of electrical and chemical engineering our prototype was able to achieve this target to reduce temperatures while using renewable energy.

BUDGET

The prototype cost 5057 SR and the remaining budget is 943 SR