ABSTRACT

In the realm of renewable energy, the comparative investigation of parabolic dish collectors with nano-fluids unveils promising avenues for enhancing thermal efficiency. Nano-fluids, composed of base fluids like water infused with nanoparticles such as SiO_2 and MgO, exhibit remarkable thermal properties owing to their high thermal conductivity. When incorporated into parabolic dish collectors, these nano-fluids demonstrate superior heat transfer capabilities compared to traditional base fluids. The essence lies in the nanoparticles' ability to augment the thermal conductivity of the fluid, thereby improving overall efficiency. Through meticulous experimentation and analysis, researchers observe significant disparities in efficiency between base fluids and nano-fluids. SiO_2 and MgO nano-fluids, renowned for their thermal enhancements, showcase notable performance boosts, accentuating the potential of nano-fluid technology in thermal energy systems. This investigation sheds light on the intricate dynamics between nano-fluid composition, thermal conductivity, and overall collector efficiency. Ultimately, harnessing the synergistic effects of parabolic dish collectors and nano-fluids holds tremendous promise for advancing sustainable energy solutions and mitigating environmental concerns.