

Design & fabrication of hybrid Stirling engine

ABSTRACT

This project is based on hybrid energy generation from solar energy and natural gas by Stirling engine. The project includes research, design, analysis and fabrication of gamma type Stirling engine and parabolic dish collector. The concept of hybrid power generation was utilized to reduce carbon emission and to ensure continuous energy supply by using natural gas in absence of solar energy.

In the first phase of project vast literature was reviewed which include research papers, engineering books on Stirling engines and solar collectors. After, considering various designs, Gamma type Stirling engine was selected due to its simpler construction and higher efficiency, whereas for solar collector, glass based parabolic dish was selected.



In the 2nd phase 3d model of engine was constructed in CREO software, whereas the thermodynamics analysis of engine and collector was performed in EES Software.

In 3rd Phase, the fabrication was carried out in private workshop, all dimensions were calculated by thermodynamics and mechanical equations; solved in EES software.

Finally, the theoretical and practical data were compared, and further improvements were implemented to reduce friction/losses and to increase efficiency. The project showed the great practicality of hybrid Stirling engine power generation systems by for Jamshoro district throughout the year.