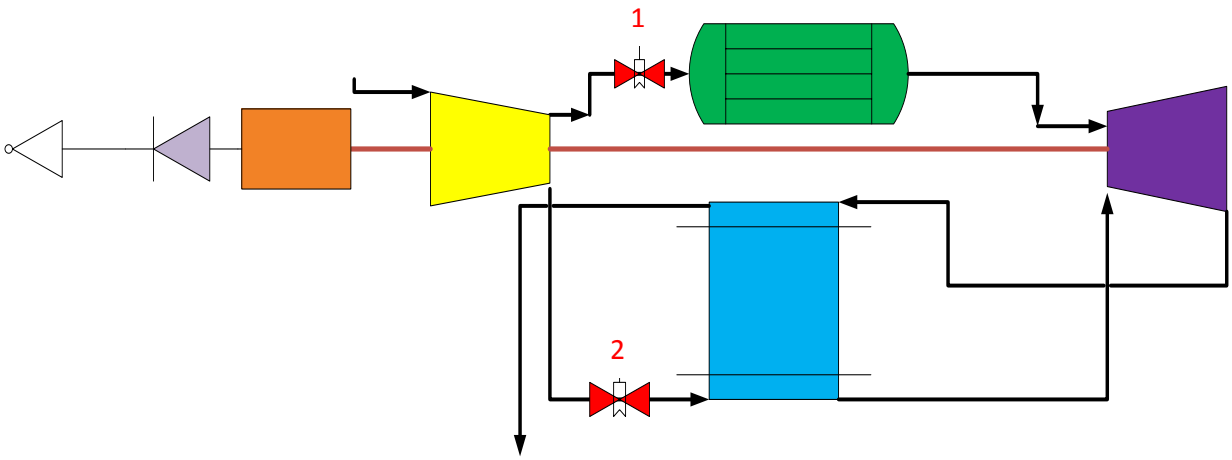
SOLAR-BRAYTON GENERATOR

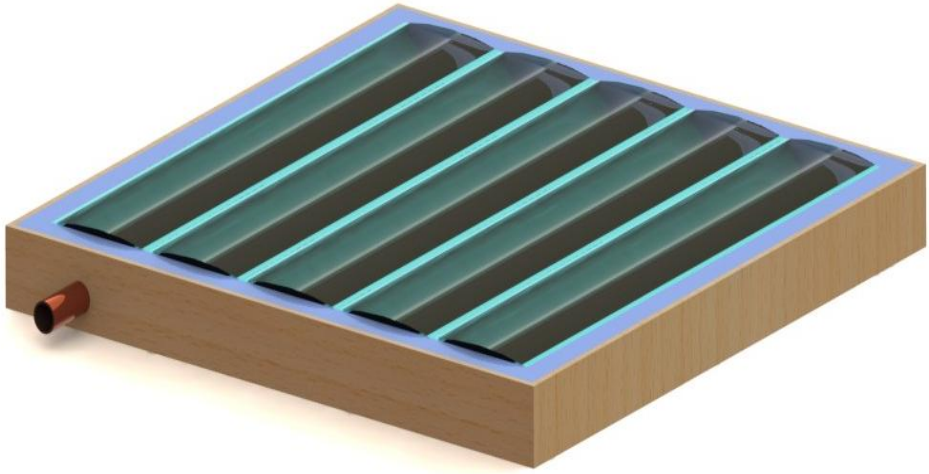


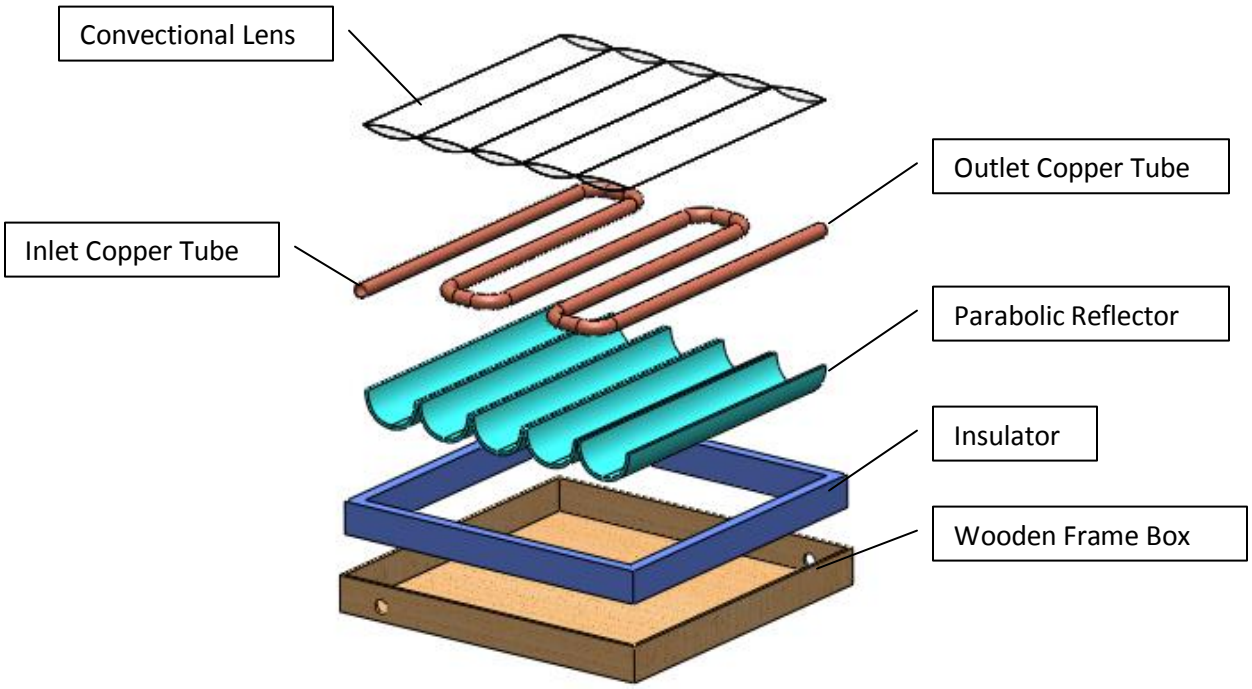
	Control Valve
	Centrifugal Compressor
	CPC Solar Heat Exchanger
	PCM Heat Storage
	Low Pressure Turbine
	Pipeline
	High Frequency Generator
	Rectifier
	60-50hz AC Inverter

The system above is miniature Gas Micro Turbines with target peak output of 10 KW, which employs unusual CPC tubular Collector as the heat source and Sodium Nitrate as the heat sink that is used later as heat recovery during no radiation condition to provide consistent electric flow. In this system consists of the following processes:

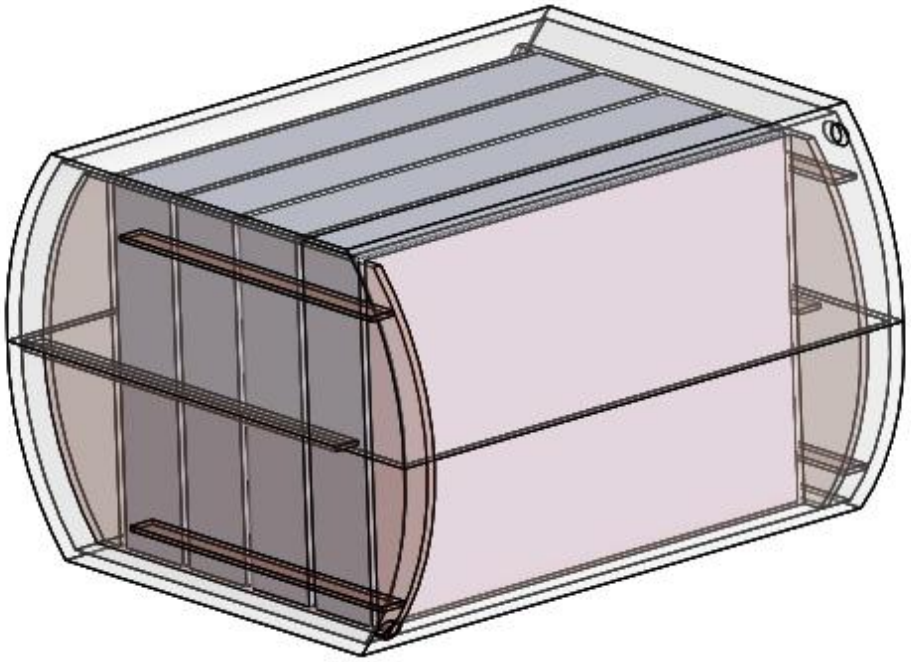
- Inlet air at ambient temperature (300K) and atmospheric pressure of (1 atm) is compressed in centrifugal compressor at compression ratio of 2 and flow rate of 1 kg/s.
- Keeping the valve-2 close and valve-1 open, the compressed gas is supplied to the CPC Solar heat exchanger. The heat exchanger is designed to supply a turbine inlet temperature of 600 K and pressure of 2 atm.
- Heated and compressed air from CPC is then expanded in an axial turbine.

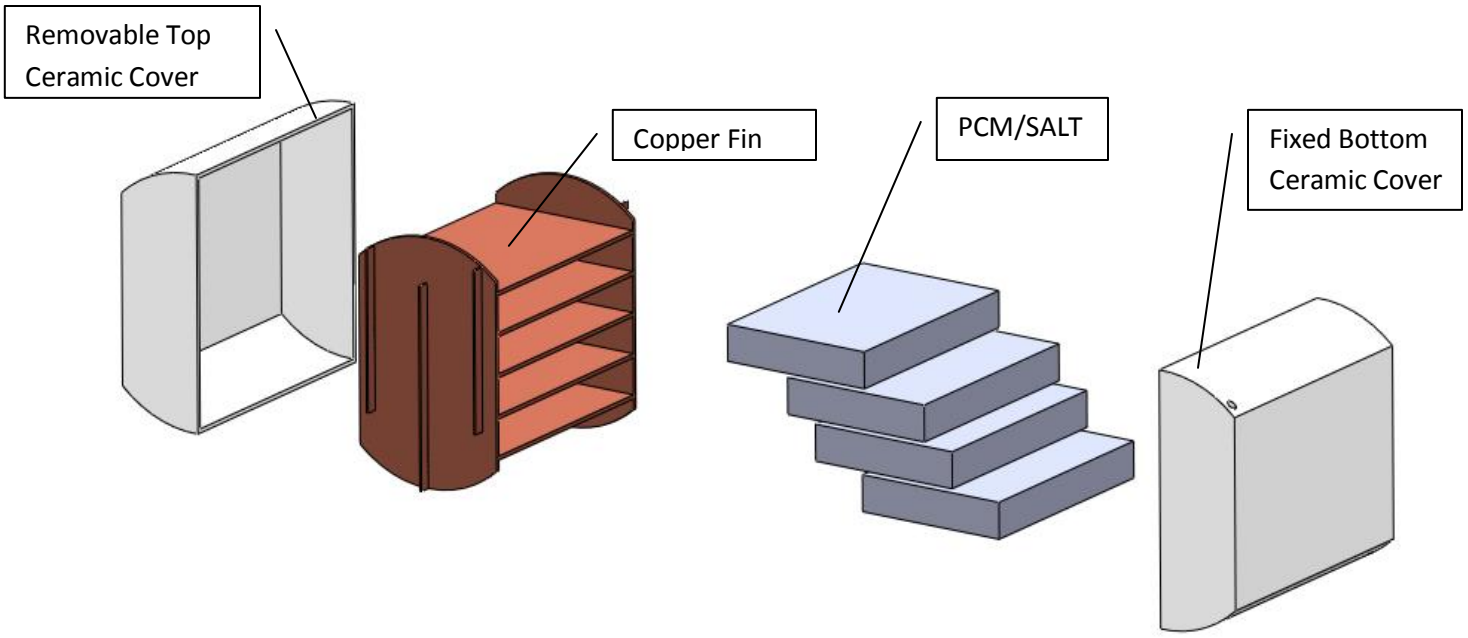
- The work generated by the turbine is transmitted with a single shaft that connects the compressor to compensate the work needed to run the compressor and a secondary shaft is used to transfer net work to the high frequency generator.
- The high-speed generator of the single-shaft design makes use of a permanent magnet and alternator to generate the high-frequency AC output.
- This power is rectified to DC and an inverter converts this DC to 60 Hz AC.
- The exhaust from the turbine outlet is passed through an intake heat sink tank which stores thermal energy in SALT.
- During no radiation, i.e. night or low irradiation period the valve-1 is close and the flow is direction in route-2 through the heat sink where the heat is absorbed from the storage.
- PCM stores thermal energy through its molecular phase change point. In going phase change, PCM can release or absorbed thermal energy at nearly constant temperature. The PCM in the system can use cheap inorganic material such eutectic salt, as heat is absorbed by crystalline shape due solid phase to change in fluid or liquid phase and reverse is achieved during liquid to solid phase transition where heat is rejected at steady temperature.
- Constant heat exchange can be achieve from PCM material during no radiation to provide low but positive net work also exhaust can be rerun over the fin in subsidiary heat addition process.





CPC Solar Reflector with Tubular Absorber.





PCM Heat Storage