Hybrid Solar PV-Thermal, Dual-Axis Linear Fresnel Collector

Linear collectors such as parabolic troughs are the most widely used type of large and medium-scale industrial collector.
However, they have not yet been commercialized for smaller-scale use, because, on a smaller scale, the length of the collector is insufficient for achieving high temperatures

GREENBMG's Solution

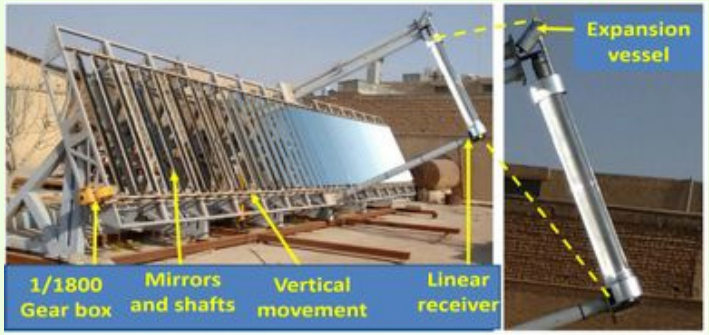
Our collector solves this problem because of the particular design of our new dual-axis solar tracker and vacuum tube metal-glass receiver.
It uses concentrated solar energy to generate electricity and thermal energy (e.g. warm water), **simultaneously.**

How It Works

The collector is a dual-axis type that can easily reach the high temperatures required and is appropriate for installation on the roofs of residential and commercial buildings. The fabricated collector, because of its **low width and high concentration ratio**, is very suitable for residential buildings. It also has the ability to track in **two dimensions** in order to be more productive than the existing commercial collectors.

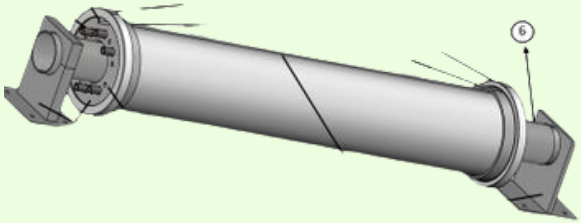
Unique Design

- Hollow metal receiver contained in Pyrex glass tube
  - Increases the thermal efficiency
- Large diameter of reciever
  - Allows high efficiency PV cells with large dimensions (125x125mm and larger) to be set on the surface
- Modular structure
  - The scale and concentration ratio can be adjusted to the customer need
  - Lower cost of transportation



Receiver Tube

In this newly-fabricated receiver, a metal tube encapsulated in a glass tube is installed to absorb the radiation and to heat the molten salt/hot oil.



Specifications of GREENBMG solar hybrid PV-thermal collector

Parameter	Value
Number of mirrors and dimensions	According to the customer need (mirrors of 180 cm x 20 cm)
Total mirror area	According to the number of modules ($1.2\ m^2$, each module area)
Receiver length	Up to 300 cm
Vertical sun tracking	0 – 90 °
Horizontal sun tracking	$0\text{-}180^0$, 0.1° precision
Receiver type and dimensions	Metal core vacuum glass tube of 23 cm diameter and 180 cm length

Potential Applications

In areas with a warm climate and high solar irradiance, the energy consumption required for residential and commercial cooling is very high. In many countries around the world, **more than 50% of the electrical energy consumed during the warm months of the year is for air conditioning**. Utilizing solar thermal energy is an efficient approach to providing the energy needed for such cooling

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