Solar Powered Generator Free Electricity

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ABSTRACT
The given paper deals with design of Parabolic dish heat collector which increases the efficiency of solar heating system. The optical efficiency of parabolic dishes is considerably higher than that of through, LFR or power tower systems because the mirror is always pointed directly at the sun, whereas the through, LFR and power tower have a reduction in projected area due to a frequent low angle of incidence of the solar radiation. 

Keywords: Parabolic dish heat collector (PDHC), solar, Heat losses, Efficiency.

Introduction
In today's climate of growing energy needs and increasing environmental concern, alternatives to the use of non-renewable and polluting fossil fuels have to be investigated. One such alternative is solar energy. Enough amount of solar heat is available, we can use this energy to heat water or to generate Electricity. Here what we do we collect solar heat by parabolic dish at a single point and we amplify heat by CO2 lazer then we have enough heat to run an Sterling Engine then we convert heat energy into mechanical energy with the help of coupling with dynamo we can generate electricity from solar energy.

Methodology
A solar ray from sun which is time dependent varies from 45 degree to 90 degree. This solar ray strikes the reflector which in turn reflects it to the RFPC (as shown in fig). All the rays from 0900 hours to 1800 hours will strike the Parabolic dish. This ray will transfer through glass into the CO2 lazer. This will increase heat and send it to steriling engine head or give start to the steriling engine which is coupled with dynamo. Dynamo starts generate Electricity. Which can be directly use or can store in batteries.

Block Diagram

Parabolic Dish
The dimensions of a symmetrical paraboloidal dish are related by the equation: $4FD = R^2$, where $F$ is the focal length, $D$ is the depth of the dish (measured along the axis of symmetry from the vertex to the plane of the rim), and $R$ is the radius of the rim. Of course, they must all be in the same units. If two of these three quantities are known, this equation can be used to calculate the third.

A more complex calculation is needed to find the diameter of the dish measured along its surface. This is sometimes called the "linear diameter", and equals the diameter of a flat, circular sheet of material, usually metal, which is the right size to be cut and bent to make the dish. Two intermediate results are useful in the calculation: $P = 2F$ (or the equivalent: $P = \frac{R^2}{2D}$) and $Q = \sqrt{P^2 + R^2}$, where $F$, $D$, and $R$ are defined as above. The diameter of the dish, measured along the surface, is then given by: $\frac{RQ}{P} + \frac{P}{2} \ln\left(\frac{R+Q}{P}\right)$, where $\ln(x)$ means the natural logarithm of $x$, i.e. its logarithm to base "e".

The volume of the dish, the amount of liquid it could hold if the rim were horizontal and the vertex at the bottom (e.g. the capacity of a paraboloidal wok), is given by $\frac{1}{2} \pi R^2 D$, where the symbols are defined as above. This can be compared with the formulae for the volumes of
a cylinder ($\pi R^2 D$), a hemisphere ($\frac{2}{3} \pi R^2 D$), where $D=R$, and a cone ($\frac{1}{3} \pi R^2 D$). Of course, $\pi R^2$ is the aperture area of the dish, the area enclosed by the rim, which is proportional to the amount of sunlight the reflector dish can intercept.

The parabolic reflector functions due to the geometric properties of the paraboloidal shape: any incoming ray that is parallel to the axis of the dish will be reflected to a central point, or "focus". (For a geometrical proof, click here.) Because many types of energy can be reflected in this way, parabolic reflectors can be used to collect and concentrate energy entering the reflector at a particular angle. Similarly, energy radiating from the focus to the dish can be transmitted outward in a beam that is parallel to the axis of the dish.

In contrast with spherical reflectors, which suffer from a spherical aberration that becomes stronger as the ratio of the beam diameter to the focal distance becomes larger, parabolic reflectors can be made to accommodate beams of any width. However, if the incoming beam makes a non-zero angle with the axis (or if the emitting point source is not placed in the focus), parabolic reflectors suffer from an aberration called coma. This is primarily of interest in telescopes because most other applications do not require sharp resolution off the axis of the parabola.

**CO2 Lazer**
As the active medium, these lasers use a suitable mixture of CO2, N2, and He. Oscillation takes place between two vibrational levels of the CO2 molecule, while N2 and He greatly improve the efficiency of laser action. The CO2 laser is actually one of the most powerful lasers (output powers of more than 100 kW have been demonstrated from a CO2 gas-dynamic laser) and one of the most efficient (15-20% slope efficiency). Nitrogen helps producing a large population in the upper laser level, while helium helps removing population from the lower laser level.
Figure (1) shows the relevant vibrational energy levels for the electronic ground states of the CO₂ and N₂ molecules. The N₂ molecule, being diatomic, has only one vibrational mode; its lowest two energy levels (v = 0, v = 1) are indicated in the figure. Energy levels for CO₂ are more complicated, since CO₂ is a linear triatomic molecule. In this case, there are three nondegenerate modes of vibration: Symmetric stretching, bending, and asymmetric stretching.

The remaining energy between the intermediate states and the ground state is lost through kinetic energy transfer, which generates heat instead of light. For CO₂ molecules, the rate of energy release through heat is much lower than energy release through light, so the energy efficiency for producing a laser beam is high compared with other lasing materials. In comparison, helium has a very high thermal diffusivity; therefore, with its addition to the lasing gas mixture, the rate of energy release through heating is extremely high. This combination of lasing interactions makes the carbon dioxide laser suitable for industrial applications in terms of both the energy efficiency (up to 10%) and the high output beam powers achievable.

The three main types of gas flow are sealed discharge tube, axialflow, and traverse or crossflow. The flow method determines how fast the post-stimulation carbon dioxide gas can be removed from the optical cavity so that new ground state carbon dioxide gas can be introduced for excitation and stimulation.

1. The sealed discharge laser contains a fixed lasing gas mixture sealed in the laser cavity; therefore, it does not require a gas supply or gas handling system. However, because there is no gas flow, output powers are limited to about 50 W (since used CO₂ cannot be discharged and replenished with new CO₂), and the lifetime of the laser is limited by the disassociation of the carbon dioxide into oxygen and carbon monoxide.

2. The second type of CO₂ laser is the axialflow laser. This is the most widely used type of CO₂ laser, in which the gas flows along the axis of the optical cavity (Fig.2). Axial flow allows the depleted gas to be replaced by new gas. Laser beam powers of up to 4 kW of continuous wave output can be achieved. Laser beams with pure Gaussian intensity profiles can be generated for power levels up to about one kW, while beams with power above one kW generally have a mixed mode output containing two or more different intensity profiles. Since the used gas is either exhausted immediately or is reused after removing any contaminants, this system requires a constant supply of gas and a gas handling system. Axial flow lasers can be further classified by the speed of gas flow, namely low-speed flow and high-speed flow lasers. Low-speed flow lasers attain power outputs of about 50 W to 70 W for each meter of cavity length. To produce a compact package, the optical cavity is folded so that longer discharge lengths can be obtained in a smaller assembly. The low flow speed causes the laser to heat up considerably, and the relatively low conductivity of the gas mixture limits the bore size of the laser tube. Heating of the resonator cavity causes distortions in the resonator optics due to thermal expansion; these distortions affect the beam intensity profile and beam stability. However, with external cooling for the resonator and optics, beam outputs with good adjustability and stability can be generated. Mgh-speed flow models typically have a gas velocity of 60 nVs. Thus, the carbon dioxide molecule only has time for one excitation/stimulation cycle before exiting the optical cavity. Typical outputs are 600 W per meter of cavity length, with total laser beam outputs available up to 6 kW. Due to the convective cooling of the high-speed flow, the

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**Fig:1**
thermal distortions in the resonator optics are minimized and larger bore diameters can be used to produce intensity profiles which are nearly Gaussian in shape.

Sterling Engine
The Alpha Stirling engine consists of two power pistons, each with a separate cylinder and connecting rod. One power piston and cylinder represents hot workspace, the other cold workspace. The connecting rods join a common journal on a single flywheel/crankshaft. This arrangement is shown in Figure 1. As the figure depicts, the hot and cold workspaces are physically separated from each other. This feature provides excellent thermal isolation for the two workspaces. The conduit that joins the two workspaces, however, adds to the dead space associated with this design.

The Alpha then, in its simplest form, utilizes four reciprocating parts and one rotary part. This configuration requires a close tolerance fit between each power piston and its respective cylinder. This
is not an issue for those components operating within the cold workspace. The hot workspace piston and cylinder do represent a problem with regard to maintaining a reliable seal in an environment with high heat coupled with sliding friction. Seals on this piston can be subject to early failure due to these operating conditions. Techniques that alleviate piston seal failure may also increase engine dead space. The Alpha is known for its high power-to-volume ratio.

System Design

![Parabolic Dish](image)

![Sterling Engine with Dynamo](image)

REFERENCES

[1] John Daniel Kraus American physicist known for his contributions to electromagnetics, radio astronomy, and antenna theory.


