VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL

VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION

ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

FLOATING SUN TRACKER HYDRAULIC SOLAR PANEL

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Abstract : *The Noticeable rise in the electricity demand, fast depletion of fossil fuels, and environmental concerns throughout the world has led to the requirement of commissioning Solar PV plants on a large scale. Solar photovoltaic (PV) installation has the burden of intense land requirements, which will always be a premium commodity. To conserve the valuable land & water, installing a Solar PV system on water bodies like oceans, lakes, lagoons, reservoirs, irrigation ponds, wastewater treatment plants, wineries, fish farms, dams, and canals can be an attractive option. Floating type solar photovoltaic panels have numerous advantages overland installed solar panels, including fewer obstacles to block sunlight, convenience, energy efficiency, and higher power generation efficiency due to the lower temperature underneath the panels.*

Keywords - *Adjustable Angle, Energy Efficiency, Floating solar, Hydraulic System, Renewable Energy Sun Tracker, Solar Panels, Water Based Installation.*

I. INTRODUCTION

*With the change in lifestyle of people in the present world and their dependencies on the newer technologies which requires energy in the form of electricity, fossil fuels etc. there is a requirement of such type of energy resources which is available in large amount in our environment. In the present time, most of the world is dependent on conventional and non-renewable sources of energy i.e. the sources of energy which will be exhausted in a time and takes thousands of years in their formation i.e. coal, petroleum products which is present in specific amount in nature and will be exhausted after few years. In fact, it is expected in the near future, that the demand for energy will grow faster than the finding out of new available fossil resources . In addition, energy needs and costs have increased in recent years and nature continues to suffer damage during energy production . Due to this a large amount of energy scarcity will occurs in the incoming years to fulfilling the increasing demand of energy. To compete with this situation there is a requirement of renewable sources of energy which is present in large amount in natures which will not be exhausted by using it. For example, wind energy, tidal energy, geothermal energy, wave energy, and the source of all of thus energy are sun that's why we can also called it as solar energy. Some investigations and hardware developments on wave energy have been led by Great Britain and Portugal . Presently, the most efficient means of harnessing this power source is the solar cell, which converts solar radiation directly into electricity . It is urgent to improve the production efficiency of electricity from the Sun as this energetic source is the most powerful in our planet, and it is expected that the Sun will become the main electricity production source by the year 2100, according to the study presented by the German Advisory Council on Global Change . This solar energy in the form of sunrays present in large amount in nature is one of the major renewable sources of energy which has a great demand in the present world. That's why newer technologies are in demand which can utilize this large amount of solar energy. As the Upnishads also says that always looks towards the centre of universe i.e. Sun for the source of energy. The power from the sun intercepted by the earth is approximately 1.8*10 MW, which is many thousands of times larger than the present consumption rate on the earth of all commercial energy sources.*

II. METHODOLOGY

Several structural design considerations should be taken into account for economical and efficient manufacturing. Many of these apply to other joining methods, and all apply to both subassemblies and the complete structure.

1. The device should be suitable for local manufacturing capabilities.

2. The attachment should employ low-cost materials and manufacturing methods.

3. It should be accessible and affordable by low-income groups, and should fulfill their basic need for mechanical power

4. It should be simple to manufacture, operate, maintain and repair.

5. It should be as multi-purpose as possible, providing power for various agricultural implements and for small machines used in rural industry.

6. It should employ locally available materials and skills. Standard steel pieces such as steel plates, iron rods, angle iron, and flat stock that are locally available should be used. Standard tools used in machine shops such as hacksaw, files, punches, taps & dies; medium duty welder; drill press; small lathe and milling machine should be adequate to fabricate the parts needed for the dual-purpose bicycle.

7. It should make use of standard bicycle parts wherever possible.

8. The device should adapt easily to as many different bicycles as possible. No permanent structural modification should be made to the bicycle.

9. Though the device should be easy to take off the bicycle, it is assumed that it would usually remain attached to facilitate readiness and ease of transport from site to site. The device, therefore, should not interfere with the bicycle's transportation mode.

10. The broad stand, which provides stability during power production mode, can be flipped upward during the transport mode. This stand/carrier would be a permanent fixture of the dual-purpose bicycle.

III. FIGURES AND TABLES

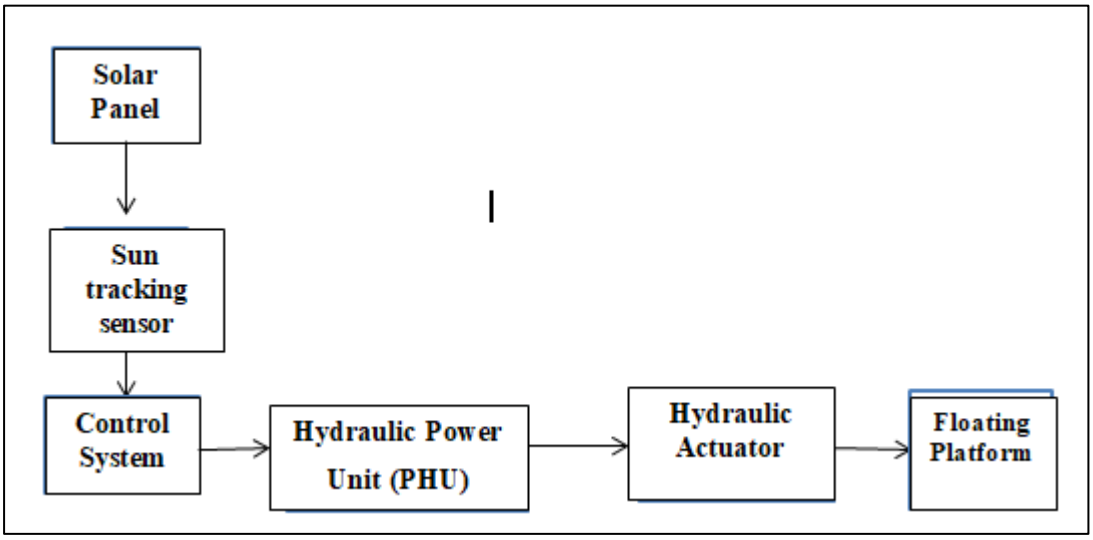

Fig 1: Block Diagram of Floating Sun Tracker Hydraulic Solar Panel.

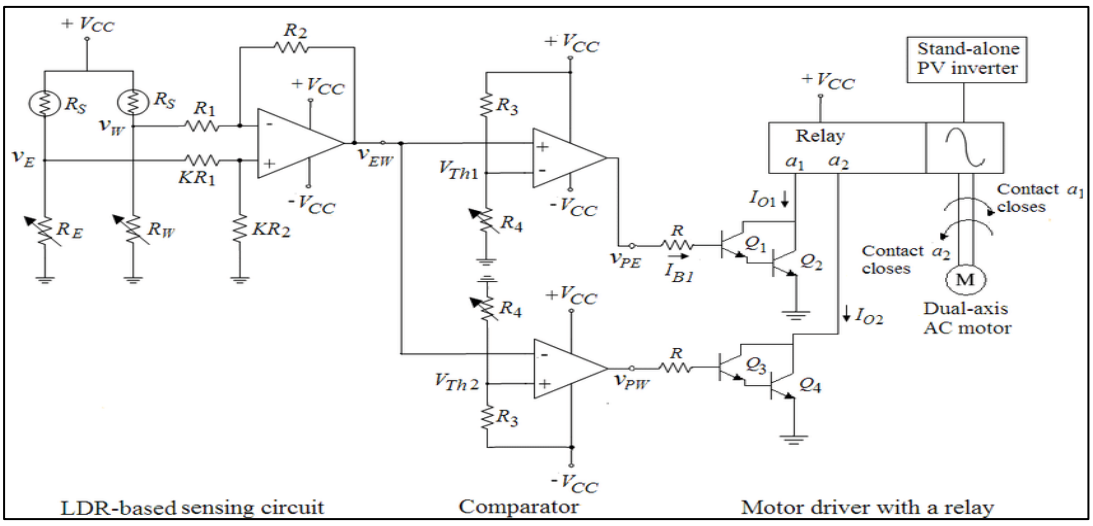

Fig 2: Circuit Diagram of Floating Sun Tracker Hydraulic Solar Panel.

IV. CONCLUSION

In this paper, a senior design project of one axis solar tracker has been presented. Students need knowledge of circuit theory, power electronics, microcontrollers, electric machines, solar power and mechanical design in order to design and implement the system. A video of the solar tracker will be shown at the ASEE conference presentation to demonstrate the operation of the solar tracker. The broad scope of this project requires the students to investigate and address a wide range of complex issues and expose students to renewable energy technologies. There is no one unique solution to the problem and a compromise has to be made based on total cost vs. reliability. Some of the comments from the team members are "Working on the Solar Tracking System provided our group with a real world experience. Our system started from just an idea which gave us the chance to work through all the challenges that come along with a group project. The best experience that I personally gained from this project was working in a group, managing a budget and utilizing skills gained from NIU and internships.", "The skills that I had gained from this project are programming in basic language, understanding the use of a solar panel to charge a battery, and the understanding of the workings of our tracking system. All in all this project has given me a nice reference for working in teams, solving problems, and an understanding of solar energy." and "My experience from the senior design project is that of hard work and accomplishment.". In the future, more advanced control algorithms such as PID control and fuzzy logic control will be studied and implemented for the sun tracking solar power system.

Acknowledgements

We shall be failing in our duty, if we will not express our sincere gratitude to all those distinguished personalities with the help of whom we have successfully completed our project. My deep gratitude to **Dr.Arun Kumar**, PRINCIPAL, VIVA Institute of Technology, who always been playing a great role in all round development of the student. My deep gratitude to **Prof.Bhushan Save**, The Head Of Electrical Department and our project coordinator **Prof. Rahul Abhyankar** and our project guide **Dr.Deepak Sajnekar** for his valuable guidance, advice and constant aspiration to our work, teaching and non-teaching staff for their kind support, help and assistance, which they extended as and when required.

Last but not the least I wish to thank my friends for providing technical and moral support . I hope that this project report would meet the high standards of all concerned people and for their continuous cooperation during the whole period of the project that helped us in the enhancement of this project.

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