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Floating Solar Power Plant

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Abstract - *The limited fossil fuel resources and higher energy demand concentrates on solar energy, which is free of cost and unlimited source of energy, eco-friendly sustainable to the environment. But during the execution of the solar project on land, problems are faced by the government and partners of the scheme such as land availability, land development and land acquisition, substation capacities, evacuation also timely clearances for the project on land and evacuation- these are hurdles for completion of the project. Most of the locations projected by the government considering solar radiation data in the country are hot and dry regions. Though at this locations radiation appeared to be higher, the energy yield of these points is less due to heating of the solar panels and higher temperature of the surface of solar cells. To overcome this problems an innovative idea has come in front for installations of solar power plants on the water that is canal tops, water bodies, lakes dam backwater and reservoirs, which generally belongs to the government. The floating solar involves solar panels and other components that are fitted onto a platform with hollow plastic or tin drums that enable it to float on water. The benefits of floating power plants will be presented.*

Keywords: -renewable energy, solar photovoltaic, solar power plant, floating solar system, floating solar PV installations.

1. INTRODUCTION

Recently, the market for solar-energy is expanding due to introduction of the RPS (Renewable Portfolio Standard). Thus, vigorous research is held on alternatives against the lack of sites to install overland Photovoltaic systems. The floating Photovoltaic system demonstrated in this is a new method of solar-energy generation utilizing water surface available on dams, reservoirs, and other bodies of water. This method has an advantage that allows efficient use of the nation's soil without bringing damages to the environment, which the pre-existing Photovoltaic systems cause when it is installed in farmlands or forests

1.1 Increasing Output and Reducing Maintenance of Solar Panels

The water bodies that the floating solar panels rest on are projected to have a cooling effect on the rear surface of the solar panels, hence reducing the temperature of the photovoltaic cells and allowing them to generate more power than those set up on land. With the probability of overheating reduced, the frequency of the photovoltaic cells necessitating care will also decrease. Therefore, floating solar panels are expected to have a higher power output and reduced maintenance requirements compared to the regular solar panels installed on the ground or building rooftops.

Advantages

- Trackers generate more electricity than their stationary counterparts due to increased direct exposure to solar rays. This increase can be as much as 10 to 25% depending on the geographic location of the tracking system.
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- Advancements in technology and reliability in electrons and mechanics have drastically reduced long-term maintenance concerns for tracking systems.

Disadvantages

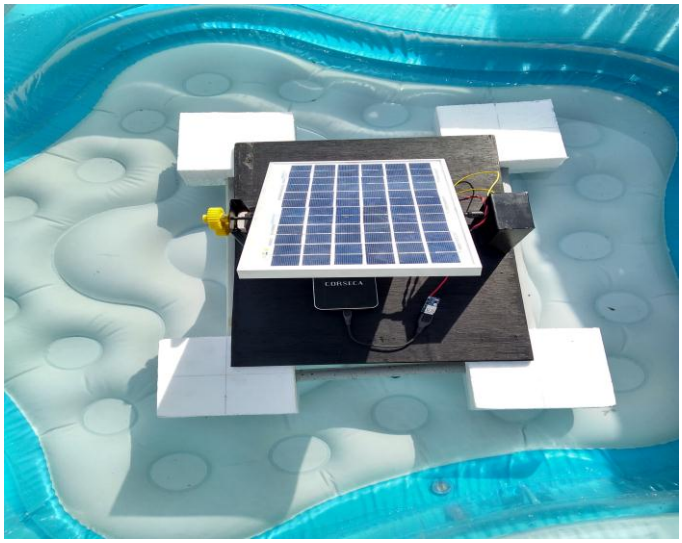
- Even with the advancements in reliability there is generally more maintenance required than a traditional fixed rack, though the quality of the solar tracker can play a role in how much and how often this maintenance is needed.
- Trackers are a more complex system than fixed tracking. This means that typically more site preparation is needed, including additional trenching for wiring and some additional grading.
- Fixed racking systems offer more field adjustability than single axis tracking systems. Fixed systems can generally accommodate up 10 20% slope in the

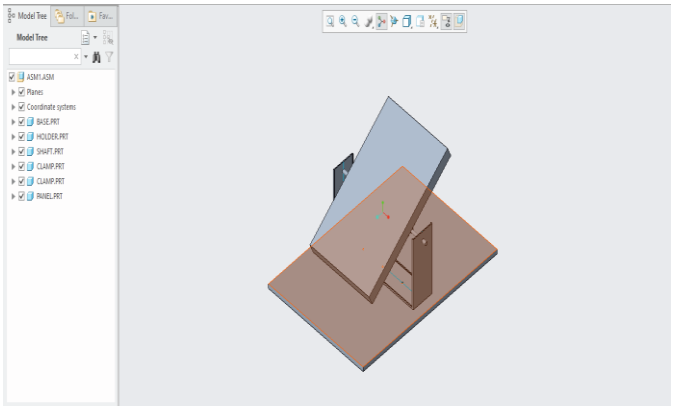
E/W direction while tracking systems typically offer less of a slope accommodation usually around 10% in the North south direction.

2. REVIEW OF LITERATURE

SR. NO.	Title	Author/Journal/ Year	Conclusion
1	Wind loads on a solar panel at high tilt angles.	Chin-cheng chou/17april2019	At high angles of tilt, there is a kink in the curve for uplift coefficient at 50 degree. Small variation is observed at high angles of tilt.
2	Study of performance of 80Watt photovoltaic panel	Zafri Azran Abdul Majid, M.H. Ruslan, Kamaruzzaman Bin Sopian, Mohd Yusof Othman./JMES/ december 2014.	The FPV panel shows an increment in photovoltaic efficiency. The design and fabrication of the PV system proves that it can increase the PV efficiency by reducing the PV temperature.
3	Analysis and prioritization of the FPV system.	Sung-min kim, myeongchan oh & hyeong-dong park/24 january 2019.	For successful application of floating PV, a rigorous feasibility assessment and planning for the redistribution of profit is most important, to minimize environmental damage.
4	Analysis and prioritization of the FPV system.	Paritosh sharma, bharat muni, debojyoti sen/ 1 may 2015.	Panels are naturally cooled as the air just above the water bodies has high content of moistures and hence it automatically solves the issues of heating losses that occur during its operation. Reduce evaporation upto 70%.
5	Floating solar photovoltaic systems: an overview and their feasibility at kota in rajasthan.	Divya mittal, bharat kumar saxena, K.V.S rao/ April 2017.	1MW floating plant at kota barrage could produce 18,38,519 kWh/year and could save 37 million litres of water and can reduce about 1,714 tonnes of CO2 emissions anually.

3. DESIGN, ANALYSIS AND WORKING





Object Name	Contacts
State	Fully Defined
Definition	
Connection Type	Contact
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Auto Detection	
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	1.6859e-003 m
Use Range	No
Face/Face	Yes
Face Overlap Tolerance	Off
Cylindrical Faces	Include
Face/Edge	No
Edge/Edge	No
Priority	Include All
Group By	Bodies
Search Across	Bodies
Statistics	
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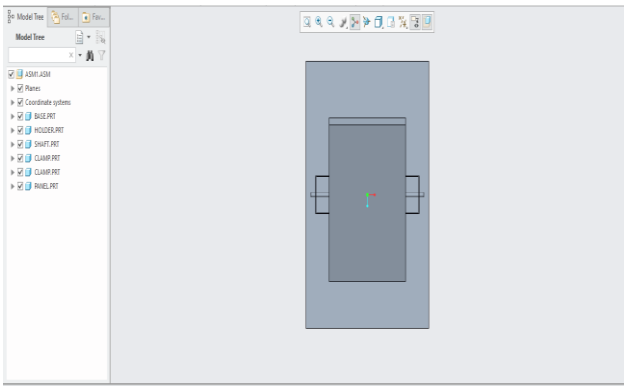
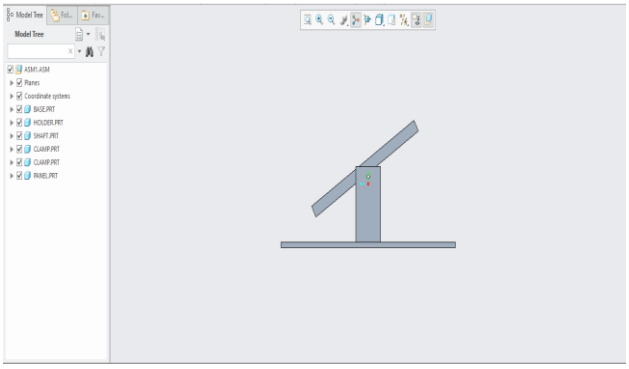
Active Connections	6





Methodology

- This technology replaces the installation of photovoltaic power plants over precious land, so these panels are naturally cooled, due to that the temperature rise of panels is less compared to roof top solar power panels.
- Floating solar panels cost is slightly higher than the roof top solar panels, but when it comes to scarcity of land problem based countries that floating solar installation cost is negligible with production profits of useful land.
- The floating solar power system also provides other environmental benefits like prevention of evaporation of water. Solar panels acts as roof for the water bodies, so the water will not exposed to sun and atmosphere.

4. CONCLUSION

- With the advancement in solar photovoltaic system, the floating solar power plant plays a vital role. The advantage of the floating system is reduction of evaporation, thus helping preserve water levels during extreme summer.
- When panels are installed on floating platform, the heating problem of solar panel on land is solved to a great extent. This floating technology is long-lasting, cost effective, flexible and less time for installation. With this advancement, country like India can meet its power demand in future.

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