

EVAPORATION CONTROL USING FLOATING PV SYSTEM AND CANAL ROOF TOP SOLAR SYSTEM

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Abstract- The crises of energy has been increased over the years due to increasing world population and expansion of ecumenical industries especially for victuals and rudimentary requisites. Most of the energy is consumed in power generation, industries & factories, conveyance, and community sectors. Moreover, in order to consummate our injunctive authorization we are mostly dependent on energy, taken from fossil oil, gas and coal. In developing countries like India, more than 70 percentage of the population lives in the rural areas where more than 85 percentage of the energy being consumed emanates from non-conventional sources, the major one being fuel wood. The incrementing cost of conventional fuel in urban areas necessitates the exploration of other energy sources. solar energy provides an alternate source of energy in rural and urban India as a supersession for fossil fuels. We can get the solar energy from sun; the sun is a major source of solar energy.

Keywords : Solar energy, Floating Solar Photovoltaic System, Canal Top Solar

1. INTRODUCTION

With growing concerns about the damages to the environment caused by burning fossil fuels, and due to ever incrementing oil demand, recently there have been numerous endeavors to ascertain an energy source which can accommodate as an alternate energy for fossil fuel. Harnessing solar energy holds great promise for the world's energy demands, and it will be heavily called upon as fossil fuels are depleted. Photovoltaic solar cells (PV) are habituated to convert some part of solar energy to electricity and they are the best culls for utilizing solar energy. Recently, renewable energy systems have undergone rapid developments around the world, and certain renewable energy industries, such as solar and wind, have procured annual magnification rates of 20 percent or more. Renewable energy is a consequential alternative source of energy that promotes sustainable development in energy sector. Solar Photovoltaic (PV) technology is the most prevalent

renewable energy option for clean energy generation. In this paper a canal top solar system is studied with plane reflectors for the concentration of the sunlight. the main parameters affecting the PV performance is irradiation, temperature and shading which is optimized. Additional cooling is not required due to the presence of water in the canal which condenses to give a cooling effect. The evaporation loss of water may further reduce and an additional solar radiation falls on the panel by the utilization of reflector.

2. SOLAR POWER PLANT

Solar energy is generated by sun created through a thermonuclear process and this process produce heat and electromagnetic radiations. These electromagnetic radiations have the energy that reaches the earth. As solar energy is an indirect source of energy, we require two components: one the collector and other the storage unit. The collector will collect the radiations emanating from the sun and convert it in the form of electrical energy. On the other hand we require storage unit since the radiations keeps varying throughout the day and during night hours there will be no radiations.

There are three types of collectors like flat-plate collectors, Focusing collectors and Passive collectors. Most of the time we utilize flat- plate panel which is a union of array of solar cells arranged in a simple plane. The efficiency of these panels depends upon the size of panel, intensity of radiations and the cleanness of the panel.

A solar cell or PV cell converts solar energy into Electrical energy by the photo voltaic effect. When the sunlight is incident upon a material surface, the electrons present in the valence band absorb energy and, being exhilarated jump to the conduction band and become free. These highly exhilarated, non-thermal electrons diffuse, and some reach a junction where they are expedited into a different material by a built-in potential (Galvani potential). This engenders an

electromotive force, and thus the light energy is converted into electric energy.

An Array of solar panels is utilized to engender electricity. The output of solar panel will be connected to the storage unit and inverter for converting the obtained direct current into three phase alternating current. The 3 phase AC power is then given to meet the load demand or alimented to grid.

Now with the concept of floating solar we are illustrating the availabilities of water bodies in different regions. Since with this conception we do not have to use a huge area, the issue of land for the solar plant can be efficiently solved. Additionally, keeping in mind the fact that land acquisition in India is not a simple task, this remotely a conception keep itself away from disputes. We all know, that during summers canals face the threat of drying up due to which irrigation question arises. With floating solar, around 70 percent of the evaporation could be interrupted which would in turn avail in the retaining sufficient amount of waters in the canals and minor river bodies. Additionally, algae formation in the water bodies can be reduced as the amount of sunlight entering into the water would decrement which in turn reduce the photosynthesis process to engender less algae in water. This makes water less contaminated and avails the aquatic life in sustaining.

3. FLOATING SOLAR POWER PLANT

A PV floating power generation results from the combo of PV plant technology and floating technology. This fusion of modern concept consists of Floating System: A floating body (Structure + Floater) that sanctions the installation of the PV module, Mooring System: Can adjust to water level fluctuations while maintaining its position in a southward direction, PV System: PV generation equipment, identical to electrical junction boxes, that are installed on top of the floating system and Submersed Cable: Transfers the generated power from land to the PV system development. As an incipient generation technology, it can change the subsisting PV plants that are installed on top of woodland, farmland and buildings. Figure 1 shows the outline of the floating solar power plant.

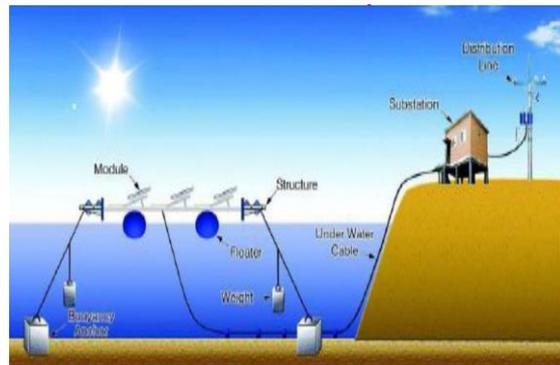


Fig1: Floating Solar Power Plant Outline

Floating solar power plants installed on water surfaces, so these panels are naturally cooled, due to that the temperature rise of panels is less compared to roof top solar power panels. So the life time of panels increases due to less stress on panels. Floating solar panels cost is remotely higher than the roof top solar panels, but when it comes to scarcity of land problem predicated countries that floating solar installation cost is negligible with production profits of subsidiary land. The floating solar power system additionally provides other environmental benefits like stoppage of evaporation of water. The systems can additionally amend water quality. Solar panels acts as roof for the water bodies, so the water will not exposed to sun and atmosphere, it integrates a beneficitation for drinking water plants. The organic matter growth such as algae will decrement, as solar panels acts as cover to water bodies. It will minimize the labour cost of water treatment plant maintenance. The construction of a floating system contains the major components as floating structures, PV panels, Inverter Mechanism, Transmission of power to grid, Control Mechanism and Monitoring Mechanism. The energy generated by floating power plant can be transmitted to load or grid by cable submerged in water. Proper planning is required to generate the electric power by utilizing floating solar power plants without interrupting the works of ponds and reservoirs. By utilizing required software's and remote control mechanism monitoring of plant elements like metrological parameters and floating platform parameters possible, and additionally controlling done by them in order to monitor malfunctions ,stop machine and actuation times.

4. CANAL TOP SOLAR

In this paper an composite structure of canal top PV system and concentrated PV system with plane reflector are studied. Here plane reflectors are placed on the canal top PV system to boost the efficiency of the system. Temperature of

the panel is not increased due to the presence of the water in the canal which gets condensed. Placing reflector is economical in case of canal top projects because costs of the supporting structures are very high compare to the reflector cost. The expected advantages of the proposed systems are

- 1) Solar radiation falling on the panel may be increased.
- 2) Efficiency of the canal top PV system may be increased.
- 3) Evaporation loss of the water in the canal may be reduced.
- 4) Strength of the supporting structure may additionally be increased.

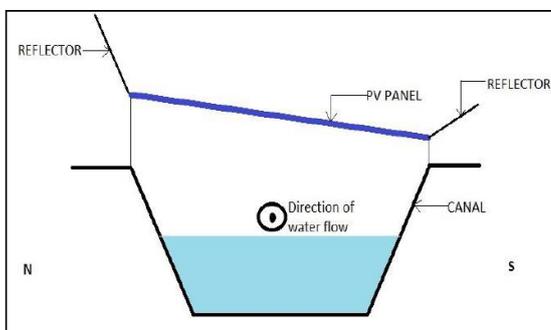


Fig2: Canal Top Project with Reflector on side

11. CONCLUSION AND RECOMMENDATIONS

The advantage of the floating system is reduction of evaporation, thus availing 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 perennial, cost effective, flexible and less time for installation. The concentrated PV system and canal top PV system are combined. As a result the drawback in the concentrated PV system, the decrease in performance due to temperature rise can be avoided.

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