New Trends In Power Plant

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ABSTRACT-

Now a days the biggest challenges before India is the power crisis. We use Renewable energy as, fossil fuels are limited in future. It is also good for the environment. Energy generation from solar has advantageous over sources of energy generation availability of land is minimum and its cost also so high. In all over the world INDIA is the seventh country having largest land. also gifted with mostly 300 days of solar radiation. Floating Solar Energy is the New technology solve all issues. This system can be installed over any water bodies; it decreases the cost of land and also increases the amount of generation with the cooling effect of water. Studies of solar panels are shown that due to cooling of solar panels its generation capacity increases by 16%.

[1]

INTRODUCTION-

Electricity crisis is the main problem in Bihar. Due to lack power, industries cannot open shops there. Bihar doesn't have enough coal to run thermal power plants. In India 65% of energy is generated With coal and Indian industry consumes 70% of total coal of the country. It is high time India moves away from coal-intensive electricity production and explores renewable energy resources like solar energy.

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 PV systems. The floating PV system demonstrated in this paper 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

PV systems cause when it is installed in farmlands or forests. Until 2012, Korea applied REC (Renewable Energy Certificate) value of 1.0 to floating PV systems similar to general PV systems. However, recognizing the technological value and necessity of floating PV systems, Korea has announced that the REC value will be 1.5 for floating PV systems, the same value as BIPV (Building Integrated Photovoltaic System), from year 2013. This paper will briefly introduce the 100kW and 500kW floating PV systems which K-water developed and installed, and analyze its utility compared with overland PV systems on the basis of its generation performance since its installation. Also, effect of wind speed, and waves on floating PV system structure was measured to analyze the effect of the environment on floating PV system generation efficiency.

Floating power plant is one which works both on wind and wave power. ... Such power plants have typically been classified into water power plants, steam power plants, nuclear power plants, etc. according both to the kind of energy source used in the power plants and to the power generation method.

CONSTRUCTION-

Pontoon –

Pontoon is a floating device made up of Polymer and has Enough buoyancy to float on water with heavy load placed on it. The platform is design to hold suitable number of modules in series parallel combination according to the requirement and space avail-ability.

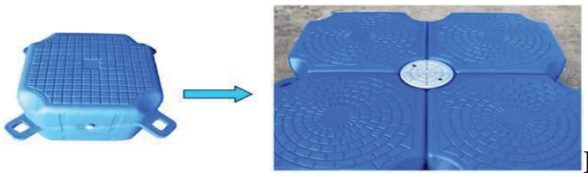

Fig 1.Pontoon

Floats:

Multiple plastic hollow floats with effective buoyancy to self-weight ratio are connected in series such as to formed a huge pontoon. They are basically made of HDPE (high density poly-ethylene), known for its tensile strength, maintenance free, UV and non-corrosive. Glass fiber reinforced plastic (GRP) can also be used for construction of floating plat-form. For fabrication of fuel tanks, milk bottles & water bottles HDPE is used.

Fig 3.Floating structure

As a rule, the Mega-Float is a floating structure having at least one length dimension greater than 60 meters. Horizontally large floating structures can be from 500 to 5000 meters in length and 100 to 1000 meters in width, with typical thickness of 2 to 10 meters.

1. Main float supporting PV module
2. Float
3. Connection for tab
4. Gasket to mount module
5. Locking for module

Mooring system:-

A mooring system is disclosed for securing floating structures to the bottom of a body of water. A base unit having a tapered recess or protrusion in the top surface is fixed to the bottom. A mooring unit sized and shaped to fit the tapered recess or protrusion in the base unit is movably attached to the floating structure so as to allow relative vertical movement between the mooring unit and the floating structure. The mooring unit is secured to the base unit so that the floating structure is horizontally restrained but can move vertically in response to waves or tidal action.

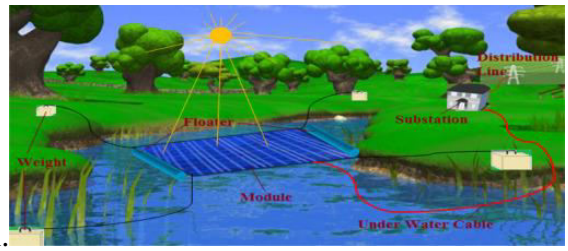

Fig.3 Layout of plant

PROBLEM'S OF THIS SYSTEM

ENVIRONMENT ISSUES:-

As the solar system is installed on the sea water, the concern due to environment impact is to be examined. The present floating solar power is similar to a ship.

Therefore the environment concern is minimal. Anchors are used to fix the solar panels and floating units. The fixing of the anchor is similar to a ship or boat. No disturbance or alternation is installed to the seabed.

As we know in rainy season more water come into the reservoir with more kinetic energy. So, due this more waves

2 created in the reservoir and system get displaced & some time it get damaged.

Mostly system is installed in the man-made pond. So there is no such causing. But if the system installed in river, so we have to protect and eliminate this effect.

So, to eliminate this and to save our system mooring system must be strong enough to with stand and more weights are connected to system. The power distribution cable floats on water. However, because of compromise with the boat traveler, a section of the cable dips into the water to allow the boat to travel through. The cable after reaches the shore, are installed the same way as the normal power distribution on lands. There is no particular concern.

How to transfer energy from panel to battery?

Cables used for this system should me robust and mechanically strong. Characteristics like

weatherproofing and temperature resistance gives a long service life to the cables.

High current capacity connectors and easy mode of assembly are to be used for the connections of the power plant cables.

With this cables power can be transfer to the battery, which is installed in battery room.

Effects of Production of FPPP on Coverage of Consumption of KAP:- Vanhoudt et al. [24] and Baetens et al. [25] used Demand Cover Factor (DCF) as a measure of efficiency of local production for coverage of consumption. DCF is defined as the ratio to which the energy demanded by, in this case KAP, is covered by the PV production, in this case the FPPP.

Where S is the local power supply, in our case, this power is related on the power of the proposed FPPP and PD is the local power demand, in our case, it is power consumption at KAP. The term in {PD,PS} represents the part of the power demand instantaneously covered by the local PV power supply or the part of the power supply covered by the power demand.

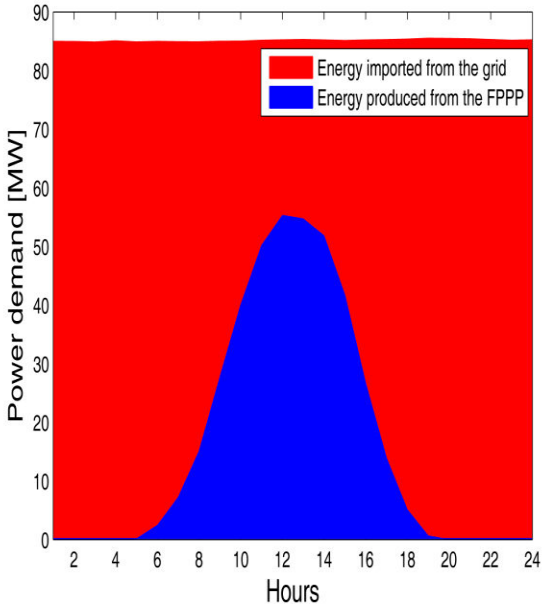

Figure 4. Average daily production of FPPP and daily consumption of KAP

Impact on the Reduction of Periodic Water Draining of the Lake:-

One of vital characteristics of Skadar Lake are the seasonal water level oscillations due to inflow from the Moraˇca River, accompanied by the limited capacity of the Bojana River to drain away water to the Adriatic Sea. Having in mind a relatively small average depth of the lake of 6 m, a delevelling of water leads to the periodic draining of the lake, thence the summer water level area is about 370 km2 , while the water surface in winters is about 540 km2 , and the average water area is 475 km2 . Bearing in mind that the FPPP project is planned at an aloof part of the lake, the water evaporation level would be significantly reduced by the presence of the PV panels, as well as a bigger water area would be retained, what should be favourable for animals and vegetation in this part of the lake because the

shortage of sunlight prevents the spreading of algae [4,8]. With regard to the significance of the effect of the evaporation decrease by the building of the FPPP, this effect is comprehensively analyzed in Section.

Benefits:-

 No land required (no land cost/availability/acquisition
issues/no uprooting of trees)

 Reduction of evaporation of water and algae growth in
water bodies

 Expected increased generation because of cooling effect on PV panels (water is at cool temperature when
the atmospheric air is hot – per day generating around
5.7 kWh / kWp)

 Reduced installation time when compared to land

 PV modules stay free from dust to large extent– resulting in low maintenance on cleaning.

Conclusions:-

This paper recommends the concept of the control of an azimuth angle FPPP which provides a production 27.68% higher in comparison to the usual conceptual solutions of the FPPP. The proposed solution consists of 18 power plants in total with an installed power of 5 MWp. The tilt angle for a PV module was determined according to the criterion of a maximum mean annual daily insolation which is 44°. Each of the power plants has its own system for tracking the Sun's azimuth that can easily be realized by using systems of motor-powered propellers and an anchor as an axis. Additionally, this paper recommends the increase of the reflecting components of the panels by using light blocks between arrays of panels, that additionally increase the production of the FPPP by 4.32%. The proposed FPPP concept provides an annual production of 186.05 MWh, or more than 20% of the total energy needs of the KAP. Based on NREL data, the estimated production of this FPPP is about 31.29% bigger than in case of a classic PV power plant with equal installed power placed on land and oriented toward the south under the optimal tilt angle of 30° in the vicinity of the planned microlocation. A significantly bigger production of the proposed FPPP concept would be achieved because of the proposed concept of tracking of the Sun's azimuth angle by the yawing motion of the platforms achieved with propellers. Also, a negative impact of a higher temperature on the production of the FPPP is reduced due to a smaller water surface temperature than air temperature. The recommended solution represents a likely solution for an ecologically acceptable supply of a part of energy for the aluminium factory in Podgorica. The recommended solution with an adopted reflected component would contribute to an annual reduction of CO2 emission for 83.42 kt CO2/year. One of the main positive ecological

effects of the building of the FPPP is the reduction of the water evaporation which would amount to about 5.41 million m3 per year. Considering that the proposed FPPP planned on an isolated and shallow part of Skadar Lake (Figures 3 and 13), whose water level in the summer months decreases to a critical height that isolates it from the rest of the lake, the effect of evaporation reduction has a very positive effect on the survival of living organisms in this part of lake.

Author Contributions:

The design and analyses of proposed concept FPPP, as well as the impact of building FPPP on reduction water evaporation is carried out by Vladan Durkovi´c under the supervision and support of Željko Đuriši´c. In addition, the manuscript was first drafted by Vladan Durkovi´c and then revised by.

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