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Floatovoltaics Power Plants

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ABSTRACT:
The continual depletion of fossil fuels and the rising global energy demand have shifted our attention to renewable energy sources. These resources are not only environmentally friendly and environmentally sustainable, but also have an infinite future. The production of solar energy has a number of benefits over other types of energy, but the main issue is the cost and availability of land for constructing the power plant. This problem will be resolved by a new solar energy technology known as a floating solar power plant. The installation of a floating solar plant on any body of water will directly lower the cost of land and enhance electricity production due to the cooling impact of the water. The technical information on the floating solar power plants is presented in this study. The plant's platform is made of hollow plastic or tin barrels, which enable it float on water, and is fitted with solar panels and other components. We'll go through the benefits of floating solar power plants.

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I. INTRODUCTION:

The advent of the Renewable Portfolio Standard has increased the demand for solar energy these days (RPS). As a result, there is intense study being done on alternatives to the scarcity of locations for the installation of overland photovoltaic (PV) systems. The photovoltaic systems that are addressed in this paper are a new method of producing solar energy that makes use of water resources found in dams, reservoirs, and other bodies of water. This approach permits effective utilisation of the nation's soil without endangering it. Up until 2012, Korea assigned floating PV systems a Renewable Energy Certificate (REC) value of 1.0, making them comparable to standard PV systems. Later on, however, after realising the technological importance and necessity of floating PV systems, Korea declared that the REC value for such power plants will be 1.5, which is the same value as BIP (Building Integrated Photovoltaic Systems), starting in 2013. The 500KW floating PV systems that were created and installed in Kerela waters are briefly described in this study, along with a comparison of their utility to PV installations on land based on electricity generation.

BACKGROUND OF FLOATING POWER PLANTS:

Companies of America, France, Italy, Japan were among the first ones to register their patents for floating solar power plant. Italians register their first floating solar power plant in the year 2008.
In India, the first floating solar power plant was installed in 2014 in Kolkata, West Bengal. This 10KW floating solar power plant was then funded as a pilot project by Ministry of New and Renewable Energy (MNRE) of India. At present, the largest installation is of 500KW power plant which is installed at Banasura Sagar reservoir in Wayanad, Kerela.

WORKING:

Combining floating technology with PV plant technology forms the foundation of PV floating power generation. It includes:

- Mooring Device

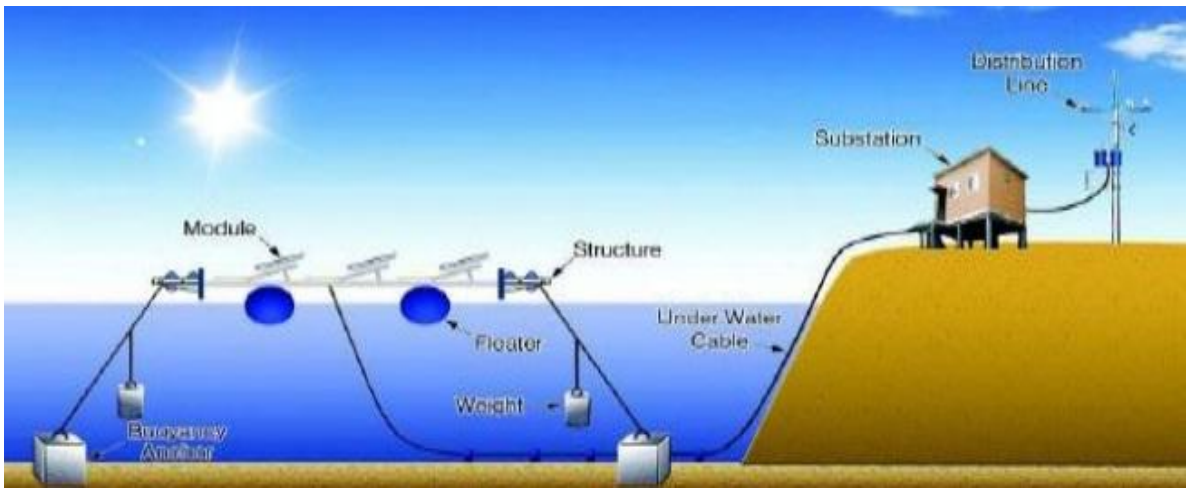
It can hold its place moving south while adjusting to changes in water level.

- PV system

It is a PV generation tool that resembles junction boxes for electrical wiring. These are mounted on the floating system's top.

- Aquatic Cables

These are utilized to transmit the power produced by the installation of PV systems to the land. These are a new generation of technology that can take the place of existing power plants that are situated atop farms, buildings, and wooded areas.



As the floating power plants are installed on water bodies, so these panels are naturally cooled. Due to this the temperature rise of panels is less in comparison to roof top solar power plants. That's why the life time of panels increases as there is less stress on the panels. The cost of floating solar power plant is a bit more than the roof top power plants, but if the problem of land scarcity is taken into account, the cost of installation of floating power plants is negligible with production profits of useful land.

ADVANTAGES OF FLOATING SOLAR POWER PLANTS:

Due to their dependency on the biggest power plant sets in the world, floating solar power plants are becoming more and more popular.

These plants can be used in both natural and artificial water bodies, including ponds, water treatment facilities, and municipal storage facilities, among others.

The following are some advantages of floating solar power plants:

- **High Panel Performance:** The water-cooling effect on the mounted PV modules helps to prevent heat loss, which raises the panel efficiency. When compared to ground-based PV facilities, floating solar power plants aspire to operate 5–16% more efficiently.
- **Longevity:** The cooling impact of the modules slows the gradual drop in temperature of the solar modules, increasing the longevity of the modules and the health of the plant.
- **Water conservation:** Floating solar energy facilities can lessen water body evaporation. Since the majority of solar power facilities are situated in inland bodies of water,for those living in urban and dry areas, they can aid in water conservation.
- **Low water uses and simple cleaning: -**

Since water is easily accessible, routine cleaning of solar panels is simple. Additionally, the water loss is negligible because the water used to clean the panels is recycled into the ponds.

Cargo ship directed by solar panels

MONETARY SCENARIO

The floating power station, which has the potential to generate electricity, was built using an existing connection. Generally speaking, floating power plants tend to be self-propelled, can travel long distances, and connect to the national grid as needed. When compared to hydropower plants, floating power stations can accommodate energy increases, particularly in remote and rural areas.

Moving energy projects also have certain advantages that will help fuel the moving energy market. Some of these advantages include faster electricity supply in areas with poor infrastructure, the ability to be exposed to areas in need of electricity, the requirement for less space as compared to power plants, and the provision of electricity in the event of earthquakes and floods.

FUTURE GOALS

A preliminary analysis of the discovery of a 600 MW floating solar power plant in Madhya Pradesh has been completed, and production of the plant is anticipated to begin in 2022 or 2023.

A 2,000-hectare project in the Mkareshwaardam will cost an estimated INR30 billion (US $ 420 million) to complete.

The Madhya Pradesh Provincial Government reported that the International Financial Corporation, the World Bank, and the Water Grid had granted a joint venture approval for the construction of the projects and that the Madhya Pradesh Water Management Company had agreed to purchase 400MW of electricity for the project.

According to a World Bank report, the installed capacity increased more than 100 times between 2014 and 2018, reaching 1.1GW.

The largest supplier as of today is the 41MW floating power station in Hamburg, South Korea. Q-CELLS headquartered in Seoul, received approval for the project from the Korea Water Resources Institute in November and stated that it will be the largest DV built in the world as well as the largest DV planned and approved in Korea.

The plant will produce enough solar energy to supply 60,000 people with their annual energy demands, which is more than the actual population of the region where it will be located, which is 44,434 people. Electricity from the project will be sold to a local government-owned company.

World's largest plant in China

II. RESULTS AND DISCUSSIONS:

These pines are naturally cooled, just like the floating pond plants that are installed on water bodies. As a result, the temperature of panels is lower in comparison to solar power plant rooftops. Thus, there is less strain put on them by making these more durable. The cost of installing solar power plants is slightly more than that of roof-top power plants, but if the issue of land scarcity.

III. CONCLUSION

After considering all of the aforementioned facts, it is clear that a floating solar system will allow for a far superior method for energy conservation. A floating solar power plant is playing a crucial role in the development of the solar photovoltaic system. The beauty of the flowing system is that it lowers evaporation, helping to maintain water levels throughout the driest summer. The problem of heat generation from solar panels on the ground is greatly alleviated when the panels are installed on a floating platform. This flooring technology has a quick installation time, is durable, expensive, and flexible. With this development, India could eventually meet its energy needs.

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