

The world's largest floating mega solar power plant to be built in Japan

Powered 5,000 households and reduced carbon dioxide emissions approximately 8,000 tons per year

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In places where land space is limited, float-type solar power generation facilities are effective. (Photograph courtesy of Kyocera Corporation)

Companies working on clean energy development are now trying to use water surfaces such as lakes, wetlands, ponds, and canals to install solar panels. Several countries, including the United Kingdom, Australia,

India, and Italy, have already announced the introduction of floating solar power systems.

In Japan, the world's largest float-type mega solar power plant will be built at the Yamakura Dam in Ichihara City, Chiba Prefecture.

Approximately 50,000 solar panels will cover 180,000 square meters of the lake surface and provide electricity to nearly 5,000 households.

When completed, it is expected to reduce carbon dioxide emissions by about 8,000 tons per year. According to estimates by the U.S.

Environmental Protection Agency, a typical car emits 4.7 tons of carbon dioxide per year. In other words, the carbon dioxide reduction of this power plant is equivalent to the emissions of 1,700 units. Completion is scheduled for 2016.

The power generation project of the Yamakura Dam is a joint project between Kyocera and Tokyo Century Leasing. The floating platform (floating structure on which solar panels are installed) is from Ciel Terre of France. Why install solar panels on water instead of on land? This is because if it is installed in lakes and reservoirs, land on land can be used for agriculture and development, and it will also protect the environment. However, some issues have also emerged.

Several challenges emerge

Unlike on land or on rooftops, float-type solar power generation has challenges that have never existed before. For one, all parts, including panels and wiring, need to be waterproofed.

In addition, there are concerns about water contamination due to weathering of the structure. Operators are required to comply with regulations related to water quality. "One of the reasons we chose Ciel Tail's floating structure is that it uses high-density polyethylene that is 100% recyclable and resistant to UV rays and corrosion," says Ichiro Ikeda, head of Solar Energy Marketing at Kyocera.



Yamakura Dam in Ichihara City, Chiba Prefecture, where a mega solar power plant is scheduled to be built. (Photograph courtesy of Kyocera)

In Japan, where typhoons, earthquakes, landslides, and high waves occur frequently, natural disasters cannot be ignored. Therefore, Ciel Terre's R&D team introduced wind tunnel testing by the French National

Institute of Aeronautics and Space (ONERA) and developed a system called "Hydrerio". The frame made of high-density polyethylene for installing solar panels can withstand winds with a maximum wind speed of about 53 meters.

Suitable for Japan

Despite the harsh weather conditions, why install float solar panels in Japan? This is because its introduction in Japan will be a poster child, that is, a good advertisement for other countries.

In the Japanese archipelago, where 75% of the country is mountainous, there is only a limited amount of land that can be used to build large-scale solar power plants. Already in the past few years, Kyocera's Ikeda points out that land-based solar power generation facilities have increased rapidly, and there is less land available.

On the other hand, rice production is thriving, and there are many reservoirs for irrigation and flood control. An increasing number of companies are considering whether they can use these to install solar power generation facilities on the water. With the advent of float-type solar power generation systems, it is now possible to effectively use places that were previously unusable.

Frequent earthquakes are not a cause for concern at Ciel Terre. "Float photovoltaic systems are less susceptible to earthquakes because they don't have the foundation or the equipment to ensure stability," explains

Eva Pauli, International Business Manager at Ciel Terr. "It's convenient for a country like Japan."

Solar panel manufacturers expect their products to replace problematic energy resources. "Japan, which has become heavily dependent on natural gas imports due to the shutdown of nuclear power plants, should need energy resources that are less dependent on foreign countries," Pauley said.

Impact on ecosystems

While this technology is promising, its potential to affect underwater life cannot be ruled out. The structure darkens because it blocks sunlight, and the water temperature gradually decreases. As a result, algae growth may stop. Liz Mesnadze, project manager at Ciel Terre, said, "For better or for worse, there will be some impact." In algae-infested areas, floating solar panels may have a positive impact on ecosystems by reducing algae growth. On the other hand, in places where endangered species live, it becomes harmful. "It's very important for power plant managers to have a good understanding of the organisms that live in the water," Mesnadze said.

Companies will be required to comply with local environmental regulations. Solar power systems will be required to be installed away from the shore, where flora and fauna are abundant. Also, a human reservoir that is less likely to damage biodiversity may be a better location than a natural lake.

In the future, at sea?

For companies in the alternative energy industry, the ocean, which occupies more than three-quarters of the earth's surface, is an excellent location to install floating power plants. However, it is still a long way to go before we can float solar panels in the ocean. According to Mr. Ikeda of Kyocera, new problems such as changes in waves and tide levels will also emerge, such as interrupting operation.

Ciel Terre is currently experimenting with a system that can be used in seawater in Thailand. However, there is a view that offshore power generation is not practical because it costs a lot of money to install and is inefficient if the electricity is produced and consumed far apart.

For now, water-mounted power generation facilities are being built in places that make effective use of limited space and are considered cheaper and more efficient than land-based types. Ciel Terre said the company's frames can keep solar panels cool, generating up to 20% more electricity than typical land-based power systems.

The power generation project of the Yamakura Dam is the world's largest floating-mounted power generation facility, but it is not the first in the world. And it won't be the end.