Sumitomo Mitsui Construction's floating solar power generation facilities, shown here installed in Tokyo Bay, can adjust easily to rising and falling water levels. By comparing and verifying multiple systems, the company aims to develop a low-cost system for generating power.

# SEA-BASED SOLAR ENERGY:
## A NEW ANSWER TO CLIMATE CHANGE?

*In a world that requires more solar power, finding the optimum place to install solar panels has become a pressing issue, so the installation of systems that generate solar power at sea has drawn much attention. With its extensive experience in a wide range of construction projects, Sumitomo Mitsui Construction Co., Ltd. is working to realize the technology as quickly as possible, based on its excellent track record in constructing infrastructure in freshwater environments.*

Renewable energy is becoming more commonplace as the world moves toward decarbonization. Solar power, in particular, is gaining traction at an accelerating speed, with large-scale power generation facilities having been installed throughout the globe. But that comes with new challenges, especially how to secure enough land to situate power generation facilities while protecting the natural environment, such as forests and other habitats. As a solution to that problem, attention is being focused on the development of new systems for solar power generation, in which solar panels float on the sea.

TAKETOMI Yukio, director of Sumitomo Mitsui Construction's Business Creation Division—which already manages many floating solar power projects in freshwater environments, including dams, lakes, and reservoirs—explains that the benefits of building such systems are not confined to merely expanding the locations where solar panels can be used. For example, while sunlight is essential, too much of it can cause the surfaces of solar panels to overheat, decreasing their efficiency and paradoxically reducing power output in the summer. However, overheating can be prevented if the panels are located on a water surface, the cooling effect of which allows them to maintain their power output. Also, there is no need to worry about slopes and inclines with floating systems, unlike in the case of land installations of solar panels.

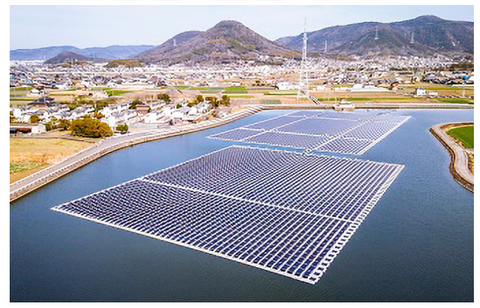
Thus, thanks to the effective use of water surfaces—normally hampered by limited usability compared with the land—larger-scale power generation facilities can be built there more easily. Moreover, since the solar panels in the systems—which have floats and anchor blocks fixed to them—simply rest on the surface of the water, there is no need for any of the preparatory construction work (foundations, etc.) normally required when installing such facilities on land. That is why floating solar power systems can be installed without reworking the natural environment.

However, several new challenges emerge when constructing the installations offshore: enabling them to withstand the motion of currents and waves is of paramount importance. Sumitomo Mitsui Construction is therefore looking to install the systems first in coastal areas and inland seas where the wave motion is relatively mild. Besides utilizing the technologies it has cultivated in freshwater environments, the company can also take advantage of its expertise in the building of ports and other types of infrastructure. By doing so, it believes that costs can be lowered and the systems realized more quickly.

The company's technology was selected by the Tokyo Metropolitan Government as a prior project making use of innovative technology in the Tokyo Bay eSG Project for sustainable urban development, with offshore solar power generation facilities installed in Tokyo Bay in April 2024. Demonstrations are currently underway to examine the mooring system, the amount of power generated, and the effects of salt damage. Also, the company is said to have already received several inquiries from various countries regarding the system's practical use.

Sumitomo Mitsui Construction has set a goal for itself of achieving substantial carbon neutrality in its own activities by 2030. To achieve that ambitious goal, it needs to minimize its $CO_2$ emissions through renewable energy power projects. As Taketomi emphatically states, constructing systems of floating offshore solar power generation will be a major factor in accomplishing that.

Lofty expectations have thus been pinned on sea-based solar power systems, which seek to harness the power of nature in its natural form. It is hoped that they will expand the potential of renewable energy, helping the world solve the issue of climate change. ●



Top: (from left) NAKAJIMA Hirohisa, deputy general manager of Sumitomo Mitsui Construction's Civil Engineering Design Department, TAKETOMI Yukio, director of the company's Business Creation Division, and TSUDA Wakaki, general manager of its Civil Engineering Design Department.
Bottom: Sumitomo Mitsui Construction's floating system for solar power generation is shown here installed in an agriculture-use reservoir in Sakaide City, Kagawa Prefecture.