

22 November 2021

THAILAND

Newsletter

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Floating Solar – Thailand’s Continuing Expansion of Renewable Energy Capacity

Introduction

One of the eye-catching headlines relating to the Thai energy industry over the past few weeks was the announcement of the completion and commencement of commercial operations of the hydro-floating solar project at Sirindhorn Dam in Ubonratchathani province. The project is the world's largest hybrid floating solar, equipped with a combination of two methods of electricity generation, and is owned and operated by Electricity Generating Authority of Thailand (“EGAT”). Floating solar projects have been gaining attention in recent years, not only because of their environmentally friendly characteristics but also due to their comparative efficiency. Given the recent appearance of floating solar in the market, it is worth considering specific issues and considerations for developers for this new type of project.

Project Locations

Floating photovoltaics (“FPV”) projects can be developed on various water surfaces, but for the purposes of this newsletter we will focus on three categories of locations.

1. *Ponds and lakes*

Ponds located on industrial estates in Thailand have already proven an attractive option for deploying floating solar technology. Several projects, in either the construction or operational phase, are situated on artificial ponds used for manufacturing effluent.

Artificial ponds on industrial estates have a number of built-in advantages which make them ideal locations for FPV projects. First, the ponds are situated next to factories, meaning they have power hungry customers in the immediate vicinity. Additionally, the industrial estate's zoning will usually permit power generation, meaning there are fewer land use concerns that may prohibit FPV development. Finally, the ponds can generally not be used for recreation or other purposes, meaning there are fewer potential objections based on alternate usage rights.

Natural lakes and ponds may also provide suitable project locations, though these potential sites may encounter a greater number of legal hurdles.

2. *Hydropower dam reservoirs*

The reservoirs formed by hydroelectric dams are another suitable location for FPV projects. Given the large surface area of many dam reservoirs, the generating capacity of FPV projects on reservoirs will generally exceed those located on artificial ponds.

Projects located on hydroelectric dam reservoirs will, by definition, be located near existing electricity infrastructure, meaning transmission and interconnection costs will be reduced. Further, locating solar projects near a dispatchable energy source like hydropower allows for grid operators to overcome the intermittency problem that is inherent when deploying solar power.

3. *Offshore*

Unlike wind, solar has not yet been widely deployed offshore. As FPV technology is still young, it is unsurprising that developers have pursued the relatively low hanging fruit available in artificial ponds and dam reservoirs. Offshore FPV projects will need to contend with more difficult climactic conditions as well as erosion of equipment caused by salt water.

Nevertheless, offshore FPV sites present a number of advantages which may result in deployment in the near future. Compared with onshore water surfaces, the surface area of prospective offshore FPV sites is abundant. Also, unlike offshore wind turbines, offshore FPV will sit on or near the surface of the water, meaning they will be invisible on the horizon and thus less likely to meet objections from local populations who are concerned about site pollution.

Floating Solar Prospects in Thailand

EGAT is the owner and operator of 14 hydropower plants that are currently in development or already operating in Thailand. Accordingly, it is well-placed to deploy FPV projects on its dam reservoirs. EGAT has announced its intention to build 16 floating solar projects on 9 dams by 2037, with a combined peak installed capacity of 2,725 MW. The first of these projects, on the Sirindhorn Dam, achieved its commercial operations date ("COD") in early November 2021 with a peak installed capacity of 45 MW. The second project in the pipeline is the Ubol Ratana Dam, with a peak installed capacity of 24 MW and a targeted COD within 2023.

There are already many smaller FPV projects in development across Thailand on inland ponds, particularly those situated on or near industrial estates. These projects encounter fewer obstacles where the ponds are located on privately owned land and the offtaker is in the near vicinity of the pond. To our knowledge, development on natural lakes or ponds has not been attempted yet in Thailand. This is unsurprising, given foreseeable difficulties in securing the land rights required for such a project. Similarly, there is no indication as at the

date of this newsletter that widespread deployment of offshore FPV projects is being considered by the Thai Ministry of Energy.

Legal Considerations

Every power project will have a distinct set of legal considerations that need to be properly understood in order for project risks to be mitigated in the transaction documents. We set out below some of the key issues that need to be considered in the development of floating solar projects.

Land Use Rights

For projects located on inland ponds, it is important to identify who the owner of the pond is. If the pond lays entirely within a single plot of land, ownership will be relatively straightforward. However, if the pond straddles multiple plots of land with different owners, a precise understanding of all demarcation lines will be necessary. In terms of bankability, the right to use the land could be in the form of a pond lease agreement. In some circumstances where the ponds are not owned by private parties, the right to use pond areas will have to be granted by relevant government agencies. It is also important to determine whether the zoning will permit the development of the FPV project.

With respect to projects located on hydroelectric dam reservoirs, investigations should be undertaken in order to understand who has the right to the surface area where the reservoir is located. A permit to use the surface area must be granted from the relevant government agency. This would depend on the area in question and may include for example the Marine Department, the Royal Irrigation Department and local authorities. Furthermore, the development of the projects must not hinder irrigation operation or obstruct irrigation systems, otherwise a separate permission from the Royal Irrigation Department for this purpose would also be required.

As for offshore FPV projects, this would require a licensing or permitting regime that would allow developers to install equipment in littoral waters (close to the shore). Laws related to offshore wind and offshore petroleum production may offer guidance in some jurisdictions.

Interconnection Point

It is critical to properly identify the location of the interconnection point in relation to the floating panels and determine whether any third-party land will be crossed. If the transmission line between the FPVs and the interconnection point will cross any privately held land, an easement or real servitude will be necessary to ensure the developer's property rights are protected. Additionally, if the transmission line will cross or about any railways, public utilities, irrigation ditches, or installations owned or operated by government agencies, separate consents may be required in order to complete the interconnection.

Contracting Structure

A key difference between floating and rooftop solar projects is that the owner of the pond where the FPVs are located may not be the offtaker of the power produced at the plant. In the event the lessor and the offtaker are distinct entities, the lease agreement and power purchase agreement ("PPA") will contain additional complexities that need to be understood and addressed.

Furthermore, it is important to identify the offtaker and understand whether it will use all of the power being generated by the FPV system for its own purposes. Alternatively, whether the offtaker will re-sell the power to neighbouring tenants should be considered, as this may impact which party will assume the risk of decreases in demand for electricity.

With respect to the EPC contract, the contractor's scope of work should include development up to the interconnection point. The project owner must ensure that it can provide the contractor with site access as needed, as this will be a fundamental obligation under the EPC contract. For this reason, coordination with any affected third parties neighbouring the site, and particularly any properties that will be subject to an easement or servitude, must be completed prior to executing the EPC contract or the issuance of the notice to proceed thereunder.

Finally, for projects located on hydroelectric dam reservoirs, the relationship between the entity operating the FPV project and that operating the hydroelectric project must be understood. If both project companies are the same entity, coordination should be relatively straightforward. If loans for the hydroelectric dam project have been provided, it will be important to assess the impact of the FPV project on any covenants of the project company under the relevant finance documents.

Terms Of Power Purchase Agreement

The PPA is the central project document for any power project, and FPV projects are no exception in this regard. Given the size of the projects and the creditworthiness of state-owned offtakers, utility-scale solar PPAs are generally bankable in Thailand. One area to consider is whether utilities will require FPV projects to enter into firm or semi-firm PPAs, meaning a backup power source or power storage system may be required. For FPV projects located on reservoirs, the firm nature of the PPA may be realized due to the complementary nature of solar and hydroelectricity as power sources. As of the date of this newsletter, we are not aware of any plans for EGAT to purchase power from FPV projects owned and developed by independent power producers.

For private PPAs, many of the issues that arise will mirror those found in rooftop solar projects. These include: ensuring the pricing mechanism properly considers demand risk, the consequences of early termination by the offtaker, force majeure, and the allocation of environmental attributes. For more information on relevant considerations for private PPAs, please see our newsletter [HERE](#)

Regulatory Compliance

As a power business operator, an FPV developer is subject to a number of licensing requirements. An electricity generation license will be required if the generated capacity exceeds 1,000 kVa. Other than projects owned by EGAT, FPV projects typically entail distribution of electricity to industrial customers, meaning the electricity will be transmitted through transmission lines to the interconnection point with the offtaker. An electricity distribution license and an electricity distribution system licence will each therefore be required, with some limited exceptions. In addition, general licenses and permits, such as a construction license and a factory operation license, are also applicable to FPV projects on the same basis as other power projects. To ensure compliance with environmental standards, FPV operators must comply with specific code of practice requirements issued by the Energy Regulatory Commission.

Conclusion

Floating solar technology is taking-off in Thailand, and there is high potential for widespread deployment in the coming decades. FPV projects can be an appealing option for developers situated in industrial estates, due to the close proximity of potential offtakers. Some key legal issues that must be considered include the usage rights over surface area, the laying of transmission lines, and interconnection, each of which should be given particular attention prior to the development of any project. Other considerations inherent when contracting with industrial offtakers, as well as regulatory compliance, must also be taken into account beforehand to ensure the timely achievement of COD. Furthermore, if debt financing is required, FPV developers must be able to demonstrate that all of these considerations have been properly addressed, as they will be subject to particular scrutiny by lenders.

If you have any questions in relation to the issues raised in this briefing, please contact the authors in the left-hand column.

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