Technical Visit to Mudajaya's 49MWac Large Scale Solar Farm

by Ir. Chong Chew Fan

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In conjunction with the recent pledge from the Government of Malaysia to increase the electricity generation in Malaysia through renewable energy to 20% of the energy fuel mix, one of the important initiatives carried out is the Large Scale Solar Farm (LSSF) projects. With the current Large Scale Solar Farm Phase 3 ("LSSF3") project in the bidding stage, IEM Electrical Engineering Technical Division ("EETD") have taken the initiative to organise a technical visit to Mudajaya's 49MWac Large Scale Solar Farm ("Plant") located in Sg. Siput, Perak on 13 April 2019 for the benefit of the members and more than 50 participants attended the technical visit.

The Plant is constructed by Entrutech Sdn. Bhd. as the Engineering, Procurement, Construction and Commissioning ("EPCC") Contractor in collaboration with a foreign solar power specialist contractor with the objective of knowledge transfer as per the initiatives of Government of Malaysia and the facility is currently owned, maintained and operated by Sinar Kamiri Sdn. Bhd. Both companies are the wholly owned subsidiary of Mudajaya Group Berhad.

Mudajaya were awarded a license to build, own, operate and maintain a 49MWac solar farm by Suruhanjaya Tenaga and subsequently they entered into a power purchase agreement with Tenaga Nasional Berhad to sell the energy generated by the Plant for a period of 21 years. The Plant is capable of generating renewable energy to power approximately 26,000 average Malaysian household. It has also contributed a reduction of 50,000 tonnes of CO_2 per annum. The Plant has officially achieved commercial operation on 27 November 2018.

The Plant is connected to the National Grid at 132kV. The Plant included a 132kV interconnecting station and a Loop-in Loop-out (LILO) switching station which was located approximately 5km away from the solar farm.

Mudajaya showed the visitors the statcom installation which is necessary to provide reactive power as per the Malaysia Grid Code. In addition, it is essential for the Plant to be designed and tested in full compliance with the Malaysia Grid Code which include but not limited to frequency response, reactive power compensation, low voltage ride through, high voltage ride through etc. Power System Study (PSS) is mandatory to be carried out to ensure all the requirements are comply with prior to the connection to the National Grid.

Mudajaya explained that one of the main challenges for the Plant development is the hilly terrain for the solar farm. It is one of the first large scale solar farm which is built such a terrain. As the concept is renewable, they want the Plant to be built with minimum impact to its natural beauty. This would mean the Plant is built on the hilly terrain without major earthwork to "flatten" the land which would have been

more ideal for solar power generation. They also wish to ensure the vegetation continue to grow under the solar panels. In terms of operation, they need to continuously maintain the grass over hundreds of acres of land so as not to affect the Plant operation. This has post challenges in the design, construction and maintenance of the Plant.

Mudajaya explained that the Plant is located at the northern hemisphere and for the efficient harnessing of sun energy, the solar panels are preferably to face south at an angle in conjunction with the latitude. Since this land is hilly and they wish to preserve the land natural terrain, it has made the design to be more complicated to ensure optimum sun energy can be harnessed. In addition due to the hilly terrain, each solar panel string will have different orientation which require experienced personnel to ensure the installation is done strictly in accordance with the design. Mudajaya highlighted that they are closely monitoring the performance of the Plant and it is reported that the Plant performance is in accordance with the original design intend.

Mudajaya also highlighted that they will need to secure various approvals from the relevant authorities for the development. This has post challenges as large scale solar farm was relatively new in Malaysia at that point of time. Many authorities require clarifications to ensure the relevant regulations is applied and conformed accordingly. Mudajaya also shown the visitors a short video of the Plant from its inception until commercial operation to give a better overview on the implementation of LSSF and the video is available on their corporate website.

The technical visit over ran its original schedule due to the enthusiasm of the visitors. IEM EETD representative presented a token of appreciation to Mudajaya for hosting the technical visit and sharing of knowledge and experience on the implementation of LSSF in Malaysia. IEM group left the facility at 5:30pm in the evening heading back to Kuala Lumpur.

EETD Chairperson handing over the token of appreciation to our host

Group photo of all participants