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Here Comes the Sun

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Over the last few weeks, we have been looking at the institutional and regulatory structure of the energy sector in Thailand, as well as at its main sources of electricity. This week, we focus on energy derived from the source of all life, the sun.

The solar energy generating capacity of a country is determined by examining what is known as solar irradiance. Solar irradiance is a measure of the electromagnetic radiation produced by the sun which hits a horizontal surface of a defined area over a defined period of time.

With its solar irradiance level of 1700-2100 kWh/m^2/year, Thailand has enormous solar power generation potential. To put things into perspective most European countries such as the UK have solar irradiance levels ranging from 900-1200 kWh/m^2/year; in comparison central Australia has solar irradiance levels ranging between 2100-2300 kWh/m^2/year.

Almost all of Thailand's solar power is generated by solar farms that are over one megawatt (MW) in capacity, with only 1% coming from industrial rooftops and/or residential sources. Most notably, the Lopburi Solar Plant in central Thailand was (at the time of its construction) one of the largest solar

photovoltaic projects in the world and continues to be the largest in the region in terms of generating capacity.
For solar energy generation to truly reach its potential in a country, it should be used on both a small and large scale. The Thai Government is pursuing this goal through a mix of legislative and policy initiatives.

Since the early 2000's Thailand has put forth several ambitious renewable energy promotion policies, the most recent being the Department of Alternative Energy Development and Efficiency's "*Alternative Energy Development Plan 2012 – 2021*" (**AEDP**). The AEDP aims to reduce Thailand dependence on fossil fuels by having renewable energy provide 25% of Thailand's total electricity generation by 2021.

Today renewable energy sources (including domestic and imported hydroelectricity) account for 11% of Thailand's total electricity generation. Solar power currently generates 448 MW of this capacity, but as of 2013 there were over 500 additional solar projects in development having nearly 2,500MW of potential generating capacity.

The Solar Photovoltaic (PV) Rooftop Program is one of the key pillars of the AEDP. The program's objective is to encourage domestic and commercial buildings to install PV systems on their rooftops with the intent of generating electricity which can be self-consumed and/or sold to the government. Excess electricity generated under the rooftop program is sold to the Provincial Electricity Authority (**PEA**) or the Metropolitan Electricity Authority (**MEA**) under the Energy Regulatory Commission's Rules and Regulations on Thailand's Solar PV Rooftop Program (**Solar PV Rooftop Rules**). These regulations outline rules for determining the eligibility of participants, sale processes and the method for calculating remuneration, and mandate use of a standardized Power Purchase Agreement to be entered into between the proposed generator and either the PEA or MEA.

Critics have questioned the efficacy of the Solar PV Rooftop Program. One impediment to its implementation has been the quagmire of licensing and permit requirements. Those wishing to install solar panel systems with a generating capacity below 3.85 kilowatts (KW, being 1/100th of a MW) on their residential homes in Thailand for private, off-the-grid consumption may do so without any licensing and permit requirements. The problem arises when such systems are to be connected to the grid or have a generating capacity in excess of 3.85KW.

Until the month, to be eligible for electricity generation in excess of 3.85KW, a factory license issued by the Industrial Works Department was required. To install solar cells from which excess electricity will be sold to the MEA or PEA through a connection to the national grid, one must be eligible under the Solar PV Rooftop Rules, must obtain a permit to alter residential buildings issued by the Civil Works Department, and must sign a standardized power purchase agreement with the MEA or PEA.

The authorities, to date, have been reluctant to issue these licenses despite support from various ministries and the Thai Photovoltaic Industries Association. Yet there is recent good news. In the wake of ongoing negotiations between the Thai Photovoltaic Industries Association and the Energy Regulatory Commission, the ERC announced on March 25th that generation of electricity under the Solar PV Rooftop Program does <u>not</u> constitute a "power plant factory" requiring a factory license.

Prior to this announcement, the permitting requirements were considered to be so time consuming that many applications for rooftop solar-cell installations were reported to have been withdrawn. One hopes

that the removal of the factory license requirement will encourage solar power advocates to look again at harnessing the sun's energy on their rooftops.

Another plank in the Thai government's solar power platform is the National Energy Policy Commission's (NEPC) Solar Power Plan 2013. It provides feed-in-tariff rates that encourage local production of solar power generated by community-owned projects. As a result, the NEPC has reserved 800MW of future licenses to be provided to these small community solar power projects.

Despite the considerable potential for solar generation on a micro and macro level in Thailand, it has yet to gain adequate traction due to the relatively high installation costs and a lack of awareness among the general public. To address this issue, academics at Chulalongkorn University are participating in a Solar PV Roadmap Initiative to increase awareness and promotion of solar energy in Thailand. We will do our part to increase awareness in future articles in this solar energy series, including by reviewing the feed-in-tariff provisions and the Green Building Code.

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