# Solar Energy Potentials In Myanmar


This project was carried out under the collaboration on renewable energy and energy conservation between Thailand and the Union of Myanmar. The project was organized by Department of Alternative Energy Development and Efficiency (DEDE), Thailand and Department of Meteorology and Hydrology together with Department of Energy Planning of the Union of Myanmar, Solar Energy Research Laboratory of Silpakorn University, Thailand was invited to carry out the project. The main objective of this project is to investigate the solar energy potential of the Union of Myanmar. In investigating the solar energy potential, solar radiation incident on the entire area of the Union of Myanmar was estimated by using a satellite-based solar radiation model. An 11-year period

(1998-2008) of satellite data from GMS5, GOES9 and MTSAT-1R satellites were used as an input of the model. The scattering and absorption of solar radiation due to clouds, water vapour and ozone, and the depletion of solar radiation by aerosols were also accounted in the model parameterization. The reflectivity data obtained from the satellites provide cloud information to the model. The absorption of solar radiation due to water vapour was computed from precipitable water data. The ozone data from the EP/TOMS and AURA/OMI satellites were used to compute the absorption due to ozone. The depletion of radiation due to aerosols was estimated from visibility data and the 5S radiative transfer model. For the model validation, solar radiation monitoring stations were established at 5 locations in Myanmar, namely Yangon, Naypyitaw, Meiktila, Mandalay and Shwebo. Solar radiation data obtained from these stations were used to compare with those calculated from the model. In addition, the comparisons were also performed with the measurement data collected from 10 stations in Thailand. These are Chiang Mai, Chaing Rai, Doi Muser, Mae Sariang, Kanchanaburi, Thongphaphum, Nakhon Pathom, Prachuap Khiri Khan, Chumphon and Ranong. The solar radiation calculated from the model and that obtained from the measurement were in good agreement with a root mean square difference (RMSD) of 8.9 %. After the validation, the model was used to calculate monthly and yearly average daily

global solar radiation for the entire country and the results were displayed as solar energy potential maps. The monthly maps show that the seasonal variation of solar radiation is mainly affected by the monsoons and local geography. High solar radiation is observed from February to May for most parts of the country. From the yearly map, it can be seen that the central plain of the country including Mandalay Division, Sagaing Division and Magway Division receive high solar radiation (18-22 MJ/m2-day) for almost the whole year. The yearly average of solar radiation for the entire country was found to be 18.3 MJ/m2-day. These results indicate that Myanmar has a relatively high solar energy potential, which can be utilized for various solar energy applications. Finally, a solar radiation database was also developed for designing solar energy systems in Myanmar