

Abstract

According to a report of Alternative Energy Development Board (AEDB) in 2015 Pakistan is facing almost 4000 MW energy shortage fall. To improve the condition and induction of more renewable power, National Electric Power Regulatory Authority (NEPRA) with the help of AEDB introduced net-metering in September, 2015. The Time of Usage (TOU) tariff and its schedule given by NEPRA is very different to the tariff used all over the world. Hence, we need a new strategy using energy saving techniques such as peak shaving and load leveling to make the best economical decision to reduce net bill of electricity. This thesis will focus on a single residential customer living in Multan, Punjab, Pakistan. The PV system is assumed to be of 6 kWh dc accordingly to the load needs of the customer and a battery storage system is assumed to be 800Ah according to its peak hour needs. The data taken from the customer shows average daily load of 43.7 kWh and the PV production daily average is 20.94 kWh for the week considered in the month of August, 2018.

The focus of this thesis is to make and test an efficient energy strategy which gives customer minimum possible net bill for a month using peak shaving and load leveling techniques, considering TOU tariff of Multan Electric Power Company (MEPCO) and its comparison with another TOU scheme based on countries like USA, Germany where these tariffs and metering techniques have been implemented successfully.

The results show that customer using grid tied PV systems with battery backup and using peak shaving and load leveling gets less net electric bill as compared to the customer using same net metering, TOU tariff with grid tied PV system with no electric energy back up the monthly approximation shows net electric bill can decrease up to 2000Pak Rs. for customer using battery and energy strategy developed for TOU tariff implemented by MEPCO.

This thesis also suggests that there are changes need to be made by NEPRA e.g. introduction of morning peak hours and different rate selling electricity to MEPCO during peak hours as compared to non-peak hours to make net-metering system more user friendly for a typical residential customer using grid tied PV system especially with battery backup.