Efficient utilization of solar PV for corporate building (KSA-case)

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Abstract

This paper presents a case study for rooftop PV system mounted on corporate building of Saudi Electricity Company HQ with a capacity of 277KWp. By collecting the generation data of the PV system along with the electrical loads of the building for the year 2021, the data showed that the amount of energy produced from the system, which was directly fed to the loads is about 404.2 MWh. Accordingly, the contribution rate of the PV system generation to energy consumption was calculated to be about 15.7% of the loads of the entire building throughout the period of 2021, which totaled about 2547.8 MWh. Moreover, carbon emissions reduction and equivalent oil barrels saving through PV system generation were calculated and estimated to be 214 tons and 655 respectively.

The study showed that there is an excess of electrical energy produced from these solar panels as a result of the system feeding only half of the building loads while the rest of the loads were fed directly by the electric grid. The system is programmed through the inverter to keep the production of solar panels equal or less than the electrical loads it is connected to due to the absence of the regulation for connecting PV systems with the electric grid at the time in which the system has been installed in 2018.

The amount of excess energy that was not used for the reasons mentioned above was estimated and calculated for the whole year. The calculated PV generation amount is 474 MWh. Hence, the surplus energy is 69.1 MWh representing approximately 15% of the calculated PV generation. At the conclusion of the thesis, it is highly recommended to exploit this amount of energy to feed other loads in the building or even exporting energy to the grid.

Biography

Fahad Alharthi, student master of renewable energy program at King Saud University. I am Saudi electricity company employee working on renewable and energy storage research projects to adopt a new technologies of these fields into SEC's network, as well as working on promising emerging technologies. Dr Abdulrahman Alamoud a professor works at king Saud university and has many publications in renewable energy as well as works as a consultant with some Saudi entities.

Notes/Comments: