

Study on the freezer system with solar energy source

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Many countries started to use renewable energy resource as an alternative energy source for electricity production because of environmental issues such as global warming and greenhouse gas concentration as a result of burning fossil fuels. Out of 5 main renewable energy resources, solar energy utilization is constantly increasing because of its mature technology and equally distributed resource throughout the world. Therefore, solar energy is used in many fields and in this study, photovoltaic system performance for meat freezer in rural areas of Mongolia is investigated. The main facilities are movable freezing container, grid connected 3kW photovoltaic modules, inverter, diesel generator and data logger to measure the parameters of this system. Starting from November 2015, we collected a year round site measurement which includes solar irradiation, outside and inside temperature of the container, electricity production and consumption. We use HOMER software to calculate the energy production by photovoltaic system and energy consumption of freezer system. Then, we compared this calculation with the real value and calculated the solar energy share of total electricity consumption. Also, we modeled an E-nose to monitor the freshness of meat preserved in the freezer. The result suggests that it is suitable to use photovoltaic system for meat storage in rural areas where grid electricity interrupts often.

Keywords: solar energy, photovoltaic system, freezing system