

琉球大学学術リポジトリ

モンゴルにおける系統連系住宅用太陽光発電システムに関する研究

メタデータ	言語: en 出版者: 琉球大学 公開日: 2023-10-05 キーワード (Ja): キーワード (En): 作成者: Erdenebat, Baigali メールアドレス: 所属:
URL	http://hdl.handle.net/20.500.12000/0002020004

Abstract

A study of grid-connected residential PV-battery system in Mongolia

モンゴルにおける系統連系住宅用太陽光発電システムに関する研究

Mongolian residential sector including houses and Gers, which are traditional dwellings, becomes not only the biggest energy consumer but also produces the highest share of emissions because of the significant increase of utilizing traditional stoves with solid fuels such as charcoal and wood in wintertime. The aim of the thesis is to seek possibilities of a grid-connected solar photovoltaic (PV) system for Mongolian houses/Gers so as to improve the access to electricity and reduce greenhouse gases simultaneously. Solar PV system is considered as ease of installation, less maintenance and the absence of rotation.

Moreover, utilizing the proposed system provides the residents much more opportunities such as self-usage and trading the surplus energy to the grid. Due to the mismatch between PV array production and demand, the necessity for battery storage systems increases. Therefore, the battery storage system is included to increase self-consumption. However, depending on tariff structure, consumption, and production, the availability of the systems might be adapted.

This dissertation seeks to investigate the possibilities of deploying the grid-integrated residential PV-battery system for Mongolian houses and develop a viable configuration. To investigate the possibilities of the PV-battery system for Mongolian conditions, to begin with, we investigated the current electricity tariff market, household load consumption, and PV generation potential. A simulation model including the PV array, battery storage system, and load for the private house/Ger is developed with historical data. A simple operation strategy based on FIT tariff mechanism using PSIM software is studied. Thereafter, the impacts of numerous households with the PV-battery system on the low-voltage network were investigated. This can be implemented effectively in Mongolian households. It confirms that tons of harmful emissions can be reduced.

Name Erdenebat Baigali