

ABSTRACT

The electricity supply on Rengit Belitung Island has not been irrigated 24 hours, so the use of generators with expensive production costs is the choice of the surrounding community. Based on these problems, PT PLN plans to build electricity infrastructure using isolated off-grid solar power plants. Planning for the construction of a small-scale isolated off grid solar power plant is carried out in two stages of modeling, namely making a design with an off-grid solar power plant load requirement of 900 kW so that the energy produced by the solar power plant \geq the energy needed on Rengit Island using PVsyst software. Second, analyze the stability of grid frequencies in the range of $49.0 \text{ Hz} \leq f \leq 51.0 \text{ Hz}$ in solar PV release conditions and intermittent using DIgSILENT software.

In this research with modeling method, the fullness of energy on rengit Island was produced by 1193639 kWh and frequency stability fluctuated with a range of 50.031 Hz – 49.979 Hz from seconds 2.024 – 2.254. Then the frequency stabilized again in seconds to 5.724 s with a frequency value of 49.985 Hz. So that the frequency stability has met the standard limit of the Minister of Energy and Mineral Resources regulation No. 20 of 2020. Therefore, the results of research on the optimal planning of small-scale solar power plants in Rengit Island, Belitung based on grid frequency stability can be applied.

Keyword: *Rengit Island, Power Plant Planning, Solar Power Plant*