

ABSTRACT

In This 4th Industrial Revolution Era, Electricity has become a primary need for everyone. However, according to the 2019 PLN Annual Report, the National Electrification Ratio in 2019 only reached 98.89% [4]. Tunda Island in Banten Province is one of the areas that has not been connected to the PLN (Off-Grid) electricity network. The source of electrical energy on the island of Tunda only relies on PLTD (Diesel Power Plant) which cannot be turned on for 24 hours due to limited PLTD fuel. The solution proposed in this research for Tunda Island is to run a hybrid PLTD with PLTS (Solar Power Plant) and Batteries which will optimize the potential of solar energy to meet electricity needs on Tunda Island.

Hybrid Power Plants that utilize NRE (New and Renewable Energy) have problems with the stability of the output power. This was caused by the intermittency of NRE. So that the composition of the hybrid generator needs to be considered. The optimal composition of PLTD, PLTS, and Batteries must be tested for Frequency Stability to determine the reliability of this Hybrid Power Plant.

This research made the model of Hybrid Diesel and Solar Power Plant plus Battery Storage that the configuration based on Tunda Island Initial Power Plant. This configuration will be optimized using Homer Energy Software with Fuel Cost, Operation and Maintenance Cost and LCOE (Levelized Cost of Energy) as the parameter. Then the stability system during intermittent conditions that make a solar radiation decrease from 100 % to 25 % will be tested at Digsilent Power Factory Software. So the result of this research will be found the Hybrid Power Plant that have reliable with cost parameter and have stability during the intermittent condition. By the result, we can conclude the sitem is qualify by Indonesian Electricity grid code in *Permen ESDM no 20 in 2020*.

Key Words: *PLTD, PLTS*, Intermittent, Hybrid Power Plant