

ABSTRACT

Nusa Penida Island is included in the 20 kV distribution system and is an isolated system whose electricity supply until 2018 comes from the Kutampi Diesel Power Plant (PLTD) and in 2021-2022 the Solar Power Plant (PLTS) is under construction. In line with the vision and mission of the government of the island of Bali, namely to realize an energy-independent Bali with clean energy and see the opportunities for wind energy on the island of Nusa Penida, a study on the development of a wind power plant (PLTB) can be carried out.

The power plant on the island of Nusa Penida applies the concept of being spread out or called Distributed Generation (DG). In terms of optimizing the location of the power plant, it can be done by applying a method, in this study a novel optimization method was used which was simulated on digsilent and compared the simulation results with the particle swarm optimization method which was simulated in MATLAB.

After the simulation was carried out, this research got the results of the optimal location for the placement of distributed generation, the PLTB is connected by switching between the GH Jungut Batu bus and the Mahagiri Hotel, the PLTD is deployed by inserting some capacity into the Mahagiri Hotel bus, and the PLTS is still located in Suana. With this combination, grid 3 Nusa is declared technically feasible because it reduces grid losses up to 73%, improves busbar voltage up to 72%, and improves loading value up to 100%.

Keywords: *Distributed Generation, Novel Optimization, Particle Swarm Optimization, Grid 3 Nusa.*