ABSTRACT

Electricity is one of the main needs of society in general. An electrical energy flows from the generator to the load through the transmission and distribution lines of electricity. The quality of this distribution system can be determined whether or not by the power received by the customer. The further away the power plant causes a reduction in power. This power reduction is due to the process of sending power from the generator to the consumer through the transmission network and distribution network where there are power losses and voltage drops.

To overcome this problem, it is necessary to install a Distributed Generator (DG) on the electricity network. The energy produced by DG is different, adjusted to the potential of the surrounding environment. The benefits of using DG include reducing power losses that may occur during the electricity distribution process. Determining where the strategic location of DG installation and how much DG capacity is is important as information data to determine the next policy.

In this final project, Particle Swarm Optimization (PSO) method is used to determine the placement and capacity of the tested PLTS using a single line diagram of the IEEE 14 bus standard distribution network. By testing the validity of the data compared with the Genetic Algorithm (GA) method. For the test results, it was found that the PSO method was able to reduce power losses from 11.6921 W before PLTS was installed and after PLTS was installed to 2.0667 W. When compared with the GA method, the power losses could be reduced by 75.98% and the PSO method was able to reduce power losses of 82.40%.

Keywords: *Optimization, 14 Bus Distribution Network, Particle Swarm Optimization Method.*