ABSTRAK

Penelitian ini dilakukan untuk mengetahui pengaruh pemasangan *Distributed Generation* (DG) terhadap gangguan arus hubung singkat tiga fasa dan satu fasa ke tanah pada Jaringan Tegangan Menengah. Penelitian dilakukan menggunakan studi aliran daya dengan metode *Newton-Raphson*. Penentuan peletakan DG menggunakan metode *Voltage Stability Index* (VSI). Penelitian dilakukan pada Penyulang Raya 10 dengan 2 skenario pemasangan DG yaitu pemasangan 1 DG dan 2 DG. Pada pemasangan 1 DG berkapasitas 2,4 MW pada bus 93 dan skenario pemasangan 2 DG masing-masing berkapasitas 1,2 MW pada bus 71 dan 93. Nilai total arus hubung singkat tiga fasa tanpa DG sebesar 216,67 kA, 1 DG sebesar 241,043 kA, dan 2 DG sebesar 241,451 kA. Untuk nilai total arus hubung singkat satu fasa ke tanah tanpa DG sebesar 118,979 kA, 1 DG sebesar 162,928 kA, dan 2 DG sebesar 174,808 kA. Pada saat tanpa DG arus hubung singkat tiga fasa di bus 93 sebesar 1,358 kA, ketika DG berkapasitas 1,2 MW di bus 93 ialah 1,626 kA, dan ketika DG berkapasitas 2,4 MW di bus 93 ialah 1,758 kA. Pada saat tanpa DG arus hubung singkat satu fasa ke tanah di bus 93 sebesar 0,613 kA, ketika DG berkapasitas 1,2 MW di bus 93 ialah 1,359 kA, dan ketika DG berkapasitas 2,4 MW di bus 93 ialah 1,655 kA. Berdasarkan dari hasil simulasi dapat disimpulkan bahwa semakin banyak DG yang terpasang pada sistem maka semakin besar pula arus hubung singkat pada sistem dan semakin besar kapasitas DG yang ditambahkan, maka semakin besar pula arus hubung singkatnya.

Kata kunci: *Distributed Generation*, Studi Aliran Daya, Metode *Newton- Raphson*, Metode *Voltage Stability Index*, Arus Hubung Singkat

ABSTRACT

This study was conducted to determine the effect of Distributed Generation (DG) installation on three-phase and one-phase short circuit current disturbances to the ground in Medium Voltage Networks. The study was conducted using a power flow study by the Newton-Raphson method. Determination of DG laying using the Voltage Stability Index (VSI) method. The study was conducted on Penyulang Raya 10 with 2 DG installation scenarios, namely the installation of 1 DG and 2 DG. In the installation of 1 DG with a capacity of 2.4 MW on bus 93 and the installation scenario of 2 DG with a capacity of 1.2 MW on buses 71 and 93 respectively. The total rated three-phase short circuit current without DG was 216.67 kA, 1 DG was 241,043 kA, and 2 DG was 241,451 kA. For the total value of single-phase short circuit current to the ground without DG of 118,979 kA, 1 DG of 162,928 kA, and 2 DG of 174,808 kA. At the time without DG the three-phase short-circuit current in bus 93 was 1,358 kA, when the DG had a capacity of 1.2 MW in bus 93 it was 1,626 kA, and when the DG had a capacity of 2.4 MW in bus 93 it was 1,758 kA. At the time without DG the single-phase short-circuit current to the ground in bus 93 was 0.613 kA, when the DG capacity of 1.2 MW in bus 93 was 1,359 kA, and when the DG had a capacity of 2.4 MW in bus 93 it was 1,655 kA. Based on the simulation results, it can be concluded that the more DG installed in the system, the greater the short circuit current in the system and the greater the DG capacity added, the greater the short circuit current.

Keywords: Distributed Generation, Power Flow Study, Newton- Raphson Method, Voltage Stability Index Method, Short Circuit Current