ANALYSIS OF THE ADDITION OF TRANSFORMER INSERTS TO REDUCE THE VALUE OF LOSSES AND OVERLOADS IN 1 PHASE DISTRIBUTION IN THE WORKING AREA OF PT. PLN (PERSERO) RAYON PARAPAT USING THE ETAP PROGRAMME APPLICATION

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ABSTRACT

The distribution transformer is a critical component in the electric power distribution system, facilitating the transfer of electricity from the distribution substation to end-users. Service interruptions, such as power outages or blackouts, can occur due to transformer malfunctions. PT. PLN (Persero), which is responsible for managing the electric power system, is committed to delivering optimal customer service. The distribution system's reliability must be rigorously maintained to ensure quality and effectiveness. In order for the distribution system to remain reliable, the percentage of distribution transformer loading must not exceed the provisions set by PLN, which is 80% of its nominal load. Likewise, the voltage drop has a maximum voltage drop provision of 4% of its nominal voltage. Installation of transformer inserts is one way to handle the excess load on distribution transformers. The research method in this final project uses a quantitative method and ETAP 16.0.0 software simulation at PT. PLN (Persero). Based on the results of manual calculation data and simulation, the percentage of Voltra transformer loading is 95%, with a voltage drop percentage of 16.9% for the X1 network and 16.5% for the X2 network and with losses of 3.8 kW for the X1 network and 3.0 KW for the X2 network. After installing the additional insert transformer, the results obtained for the percentage of Voltra transformer loading are 51% with a voltage drop of 3.9% for the X1 network, 4.0% for the X2 network and a loss value of 0.4 KW for the X1 network and 0.5 KW on the X2 network.

***Keywords**: Distribution transformer, Insert transformer, Overload, Voltage drop, Losses.*