OVERLOAD PREDICTION ANALYSIS OF DISTRIBUTION TRANSFORMERS IN KENTUNGAN 4 FEEDER USING ETAP 19.0.1

Shafinda Pramagesti
Electrical Engineering Study Program, Faculty of Science and Technology
University of Technology Yogyakarta
Jl. Ringroad Utara Jombor, Sleman, Yogyakarta
E-mail: shafindprmgst@gmail.com

ABSTRACT

The rapid growth in electricity demand across industrial, commercial, and residential sectors has significantly impacted the stability of power distribution systems, particularly in 20 kV networks that rely on distribution transformers. An imbalance between transformer capacity and load can lead to overload conditions, which shorten transformer lifespan and trigger service disruptions due to protection system trips. This study analyzes overload prediction on a three-phase transformer connected to the Kentungan 4 feeder in Sleman through simulation using ETAP version 19.0.1. Empirical data from transformer pole load measurements between 2022 and 2024 were used to calculate annual growth, which was then projected to 2027. The analysis shows both linear growth below 10% and significant increases above 10%, with substantial growth occurring from 2022 to 2024 and continuing linearly through 2027. The ETAP simulation model identifies potential overload hotspots and visualizes the distribution of critical load points through a single line diagram. As a mitigation strategy, the study recommends the installation of auxiliary transformers to redistribute the load and prevent overloads. In conclusion, this analysis underscores the importance of data-driven planning and simulation-based forecasting in enhancing the reliability of electrical distribution systems.

Keywords: Distribution Transformer, Overload, Kentungan 4 Feeder, Load Prediction, ETAP