ABSTRACT

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Title	:	*Analisis Pengaruh Penggunaan Kapasitor Bank Terhadap Harmonisa Beban di TeeJay Waterpark Tasikmalaya*

Harmonics can occur in electric power systems. This is caused by non-linear loads such as variable speed motors, power converters, and communication equipment. In addition, these harmonics can significantly degrade power quality, causing problems such as overheating of transformers, increased power losses, and distortion of voltage and current waveforms. To overcome this, capacitors are usually installed, which aim to improve power quality by reducing harmonic distortion. However, improper installation or sizing of capacitors can have adverse effects, requiring careful consideration of the type, size, and placement of capacitors to optimize their performance.

This study discusses the impact of installing capacitor banks on harmonic distortion in the electric power system at TeeJay Waterpark, Tasikmalaya, with a focus on power quality parameters such as voltage, current, frequency, and phase stability. Data collected for a week (February 11-17, 2024) revealed that the voltage level at the water park installation often exceeded the standard limits set by standards such as SNI 04-0227-2003, and showed fluctuations outside the ideal range. In addition, significant current imbalance was observed, exceeding the threshold set by ANSI-C84.1-1995, indicating that the load distribution across the phases is not ideal. In addition, the Total Harmonic Distortion (THD) of the current in the system has a value higher than the limit set by IEEE 519-2022.

Through simulations, this study compares the effects of the capacitor bank when it is active and inactive. The results show that when the capacitor bank is active, there is an improvement in power quality, with reduced real power consumption and lower current values, despite the same active power usage. This proves the importance of proper capacitor sizing and placement in reducing harmonic distortion and improving overall power quality, especially in systems with dominant non-linear loads.