

***Analysis of Biogas Pressure Stability as Fuel for a Generator in Suco Village***

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***ABSTRACT***

*This study aims to analyze the effect of compressor usage on biogas flow rate and to examine the effect of biogas operating pressure conditions on generator set performance in Suco Village, Jember Regency. The research was conducted using an experimental method by comparing generator set operation under two conditions: without a compressor and with a compressor. The observed parameters included biogas flow rate, biogas operating pressure, voltage, electric current, water temperature as the heating medium of the heater, and generator set operating capability at loads of 600 W and 1200 W. The results showed that the use of a compressor increased the average biogas flow rate from 1.89 L/min to 2.85 L/min. At a 600 W load test, the generator set output voltage remained at 220 V under both testing conditions, while the average current increased from 1.819 A to 1.920 A. At a 1200 W load test, the average operating time of the generator set increased from 107 seconds to 228.33 seconds, accompanied by an increase in the average final water temperature of the heater from 32.67°C to 70.33°C. These results indicate that the use of a compressor with operating pressure regulation through a pressure regulator helps maintain the biogas supply condition before entering the generator set, thereby supporting the generator set's ability to maintain operation. Therefore, the use of a compressor affects the increase in biogas flow rate and the operating capability of the generator set, particularly under high-load conditions compared with operation without a compressor.*

*Keywords: biogas, renewable energy, generator, compressor, flow rate, pressure stability.*