

ABSTRACT

Increased level of air pollution is one of the environmental problems that occur in big cities in Indonesia. This study aims to develop an air quality monitoring system with measuring parameters are carbon dioxide (CO₂) and particulate matter (PM_{2.5}), as well as meteorological parameters (temperature (T), relative humidity (RH), light intensity (I), pressure (P), precipitation, and wind speed/direction (WS/WD)). The system is equipped by solar panels as a backup voltage source, a battery to store the electrical energy from the solar panel, and a charger module that functions to control battery charging from the solar panel. Location measurements were carried out in 2 locations, namely Tokong Nanas Building (R1) and Deli Building (R2), Universitas Telkom, Bandung, which was conducted on February 1, 2019 - January 31, 2020. Data communication uses GSM (SIM900A) which is sent to the cloud database every 2 minutes and stored in the data logger. The measurement results at the two locations differed from the dry, rainy, and transition seasons. The daily and 8-hour average for the concentration of PM_{2.5} and CO₂ in R1 and R2 respectively is 44 µg /m³ and 521 ppm and 60 µg /m³ and 621 ppm in the rainy season, while for the dry season is 35 µg /m³ and 491 ppm, and 60 µg /m³ and 686 ppm. In the transition season, these concentrations are 41 µg /m³ and 504 ppm, and 61 µg /m³ and 672 ppm. The concentrations of PM_{2.5} and CO₂ in R2 are higher than in R1. This is because the location of R2 is lower than R1 and it is influenced by the location of the anthropogenic activity. Location R1 has a higher concentration in the rainy season because the planetary boundary layer in the rainy season has decreased which results in transboundary air pollution mixing with local air pollution. Whereas for the R2 location the concentration in the dry season was higher because the vegetation activity was more active in the dry season.

Keywords: *Bandung Metropolitan Area, GSM, Air Quality, Low-Cost Sensor, Particulate Meter, Seasonal.*