

ABSTRACT

Monitoring and recording the energy usage such as electricity, water, and gas are still done manually in Indonesia. Utility provider and user can not know the energy usage in real time. Manual recording can cause troubles if access to user's residence are blocked. Energy efficiency also not maximum enough if energy monitoring is still done manually. These problems can be solved by Smart Meter support on Advanced Metering Infrastructure (AMI) services. However, because Smart Meter only use a small amount of bandwidth, so the existing technology is considered inefficient. Therefore, NB-IoT, LoRaWAN, and Sigfox can become the candidate as the connectivity technology to support AMI services.

This Final Project research are conducted on Jakarta City as the representative of Dense Urban area in Indonesia. Planning on this Final Project research is using three technologies, which is NB-IoT, LoRaWAN, and Sigfox with scope of discussion based on the number of gateways or acces points needed for each of the technologies, the signal level, throughput, and SNR simulation results. The simulation results are then compared the number of gateways required and the last is giving the suitable technology recommendation for AMI services in Dense Urban, more precisely in Jakarta City.

From the simulations and the calculation results, it was found that NB-IoT needs at least 53 gateways with average signal level of -48,15 dBm, average throughput of 207,91 kbps, and average SNR of 9,01 dB. LoRaWAN needs at least 20 gateways with average signal level of -72,17 dBm, average throughput of 21,88 kbps, and average SNR of 9,77 dB. Sigfox at least needs 78 gateways with average signal level of -67,64 dBm, average throughput of 0,03 kbps, and average SNR of 28,92 dB. From the planning results, it can be concluded that LoRaWAN is recommended as connectivity technology for AMI services in Jakarta City because LoRaWAN needs the least number of gateways.

Keywords: *Advanced Metering Infrastructure, Internet of Things, NB-IoT, LoRaWAN, Sigfox, Smart Meter, Dense Urban.*