

**Title:** Development of an ANN-based Estimated Electricity Billing System

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**Abstract:** This paper presents an Artificial Neural Network (ANN) model to determine the estimated monthly payment for electricity consumed by residential consumers. The network was trained, validated and tested with five consumer input attributes which comprises type of apartment, number of occupants, average daily power supply, scored categories of electrical appliances and scored behavioural energy usage pattern. The corresponding output data comprises of the average monthly payment obtained from metered residential customers. A combined R-value of 0.99923 was obtained for the trained network. This indicates a very accurate ANN training. The developed network was then utilised to compute the estimated monthly amount to be paid by unmetered residential consumers. Comparisons were also made with the rather unclear and controversial estimated amount utilised by the electricity distribution companies in Nigeria. This work therefore provides a better method for estimated billing in the absence of prepaid meter, which has been of inadequate supply to electricity users in developing countries like Nigeria.

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