The objectives of this study were to develop a mathematical model and to simulate longan drying for evaluating the optimum conditions. The specific energy consumption and average drying rate were used for the verification of the model. It was found that the simulated results agreed with some of those experiments. The effects on the specific energy consumption of drying air temperature, fraction of air recycled, and specific air flow rate were described. It was found that the specific air flow rate, drying air temperature and fraction of air recycled affect significantly on specific energy consumption. However, the effects of specific air flow rate and drying air temperature on specific energy consumption were small when fraction of air recycled was big. Additionally, it was also concluded that the optimum specific energy consumption of 3.3 MJ/kg-water occurred at fraction of air recycled of 95%, specific air flow rate of 28 kg-dry air/h-kg dry longans, drying air temperature of 75 °C and drying time of 33 h.