The objective of this work is to determine the optimal operating conditions for the process of longan drying. The evaluation criteria of the process are the specific energy consumption and the drying time. Mathematical models were developed to simulate the longan drying process. The models are verified by comparison between the predicted results and experimental measurements. Comparisons between the predicted results and the measurements showed good agreement. The models were used to evaluate the effects of the operating parameters on the specific energy consumption. The operating parameters are drying air temperature, specific airflow rate, and the fraction of recycled air. At the optimal operating conditions, the specific energy consumption was determined to be 4.2 MJ/kg-water.