At present, electric supply industries in Thailand are vertically integrated. However, if the power pool is constituted, the electricity trading activities can be carried out by market participants. In this sense, it causes all the concerned entities, i.e. state-owned and private entities, to conduct pre-study, prepare, and adapt themselves to participate in the pool. The computer simulation of power pool operation is normally employed to support the entities for these purposes.

This thesis proposes the simulation models of the electric power dispatches. The proposed models can be categorized into two categories, i.e. normal and real-price models. The objective of the electric power dispatch is based on the social welfare maximization. In each model, the purchased electricity can be divided into elastic and inelastic demands. To solve the dispatch problem, the technique employed in this thesis is based on Linear Programming (LP) technique with full AC Newton-Raphson power flow. Then, the pricing mechanism is derived for both nodal and zonal prices. For the nodal prices, they are achieved together with the dispatch results, whereas, the zonal prices are achieved from the averaging approach with respect to the demands at each bus. For clustering the buses into the zones used for the zonal pricing, this thesis proposes the three based methods i.e. geographic clustering, electrical distance clustering, and congestion distribution factors clustering. In addition to the nodal and zonal pricings, the method for allocating the transmission cost for the pool market structure is also proposed. The developed methods are tested with the 9 bus and IEEE 30 bus test systems. Satisfactory results are obtained